BODY BUILDER MANUAL

FOR

2017 CHEVROLET EXPRESS/GMC SAVANA
ELECTRICAL SECTION

Revision 1.0

www.gmupfitter.com

August 2, 2016

GM UPFITTER INTEGRATION

Note to User:
As part of our mission to provide an up-to-date website that includes detailed Body Builder Manuals, Technical Bulletins, and Best Practice Manuals, we are now using sectional excerpts directly from the General Motors Service Information publications for our Electrical Body Builder Manuals.

You will note that the section numbers are non-sequential as we have provided only those that are believed to be the most pertinent to the Upfitter community and best suited to their needs.*

This new usage of the Service Information provides the opportunity for us to remain consistent with the changes that take place throughout the model year and to provide you updated information in a more timely fashion.

**** If you would like to have access to all of the electrical Service Information, please apply for a subscription from ACDelco at http://acdelcotechconnect.com/html/tss_tech_esi.jsp***

General Information

General Information

Introduction

RPO Code List

The production/process codes provide the description of the regular production options (RPOs). The RPO list is printed on the Service Parts Identification Label.

RPO Code List

RPO	Description
01U	PRIMARY COLOR-EXTERIOR, SPECIAL (02)
40P	WHEEL COLOR-WHITE (91)
52G	TRIM COMBINATION-CLOTH, MED NEUTRAL II (G) (00)
52I	INTERIOR TRIM-MED NEUTRAL II (I) (96)
52W	TRIM COMBINATION-VINYL, MED NEUTRAL II (W) (00)
5AZ	ACCESSORY-SAFETY KIT - UNIVERSAL
5BV	PROVISIONS-ELEC - UPFITTER
5C6	HOOK-CARGO TIE-DN
5DL	PROVISIONS-ELEC - UPFITTER (INCOMPLETE)
5Y3	ACCESSORY-TOW BALL - TRAILER HITCH
86U	PRIMARY COLOR-EXTERIOR, WHEATLAND YELLOW (02) 253A
93G	TRIM COMBINATION-CLOTH, MED DK PEWTER II (G) (03) (GMT610 - "G" VAN)
93I	INTERIOR TRIM-MED DK PEWTER II (03) (GMT610 - "G" VAN)
93W	TRIM COMBINATION-VINYL, MED DK PEWTER II (W) (03) (GMT610 - "G" VAN)
9L7	EQUIPMENT-ACSRY WRG JUNC BLK
9N2	GVW RATING-10,050 LBS
A07	WINDOW-BODY (DO NOT USE AFTER M.Y. 2011)
A08	WINDOW-BODY, RH (DO NOT USE AFTER M.Y. 2011)
A12	WINDOW RR-DR, STA
A13	WINDOW SIDE DR-RR, STA
A17	WINDOW SIDE BODY-SWING OUT, LH

A18	WINDOW RR-DR, SWING OUT
A19	WINDOW SIDE DR-RR, SWING OUT
A31	WINDOW-POWER OPERATED, ALL DOORS (DO NOT USE ON NEW/MAJOR PROGRAMS)
AG1	ADJUSTER FRT ST-POWER, MULTI-DIRECTIONAL, DRIVER
AG2	ADJUSTER PASS ST-POWER, MULTI-DIRECTIONAL
AJ1	WINDOW TINTED-DEEP, ALL EXCEPT W/S AND DRS (DO NOT USE AFTER M.Y. 2011)
AJ3	RESTRAINT SYSTEM-SEAT, INFLATABLE, DRIVER, FRT
AK5	RESTRAINT SYSTEM-SEAT, INFLATABLE, DRIVER & PASS FRT
ANC	SALES PACKAGE-SHUTTLE BUS
AR7	SEAT-FRT BKT, STANDARD
AS5	SEAT-FRT BKT, DELUXE,
ASF	RESTRAINT-ROOF SIDE (LH & RH), SEAT SIDE (FRONT 1ST ROW), INFLATABLE
AT8	RESTRAINT PROVISIONS-CHILD, RR SEAT, RR FACING
ATG	LOCK CONTROL, ENTRY-REMOTE ENTRY, STANDARD RANGE
AU3	LOCK CONTROL-SIDE DR, ELEC
AXK	VEHICLE TYPE-TRUCK
AXP	VEHICLE TYPE-MULTI-PURPOSE PASSENGER VEHICLE
AXW	VEHICLE TYPE-BUS- (NOT SCHOOL BUS)
B30	COVERING FLOOR-CARPET
B31	COVERING FLOOR-VINYL, FRT, FULL WIDTH
B32	COVERING FRT-FLOOR MATS, AUX
B33	COVERING REAR-FLOOR MATS, AUX
B38	COVERING FLOOR-VINYL, FRT & RR, FULL WIDTH
B3D	SALES PACKAGE-SCHOOL BUS
B46	TRIM EQUIPMENT-SPECIAL ORDER

BA0	ORNAMENTATION-EXTR, DOOR, NAMEPLATE
BA3	COMPARTMENT-STOWAGE, I/P LOWER EXTENSION DELUXE
BAG	PARTS PKG-EXPORT
BNC	PARTS PKG-BODY MOUNT CUSHIONS
BTV	REMOTE START-ENGINE
BUE	KIT-EXHAUST DIESEL
C36	HEATER-AUXILIARY
C42	HVAC SYSTEM-HEATER, OUTSIDE AIR, DELUXE
C49	DEFOGGER-RR WINDOW, ELECTRIC
C4K	GVW RATING-9,925 LBS
C4M	GVW RATING-9,900 LBS/4,500 KG
C60	HVAC SYSTEM-AIR CONDITIONER FRT, MAN CONTROLS
C69	HVAC SYSTEM RR-AIR CONDITIONER
C6P	GVW RATING-8,600 LBS/3,900 KG
C6Y	GVW RATING-9,600 LBS
C7I	GVW RATING-14,200 LBS.
C7N	GVW RATING-12,300 LBS
C7Q	GVW RATING-8,800 LBS/4,000 KG
C8V	GVW RATING-13,980 LBS
C99	SWITCH-INFL RST I/P MDL MAN SUPPRESSION
CEK	EMISSION OVERRIDE-EMISSION OVERRIDE CALIFORNIA SYSTEM FOR VEHICLES OVER 14,000 LBS GVW
CEM	EMISSION OVERRIDE-EMISSION OVERRIDE FEDERAL SYSTEM FOR VEHICLES OVER 14,000 LBS GVW
CGN	LINER-PUBX, SPRAY ON
CU7	COUNTRY-KUWAIT
CU8	COUNTRY-SAUDI ARABIA
CV3	COUNTRY-MEXICO
CV4	COUNTRY-ISRAEL

CW2	COUNTRY-GULF AREAS (BAHRAIN, KUWAIT, OMAN, QATAR, SAUDI ARABIA, UAE)
CW9	COUNTRY-MISCELLANEOUS
D28	MIRROR O/S-(-NONE)
D2O	COUNTRY-CURACAO
D31	MIRROR I/S R/V-TILT
D3J	COUNTRY-CAYMAN ISLANDS
D3K	COUNTRY-DOMINICAN REPUBLIC
D3L	COUNTRY-EL SALVADOR
D3M	COUNTRY-GUATEMALA
D3P	COUNTRY-HAITI
D3Q	COUNTRY-HONDURAS
D3U	COUNTRY-ST MAARTEN
D4G	COUNTRY-BAHAMAS
D4N	COUNTRY-COSTA RICA
D4X	COUNTRY-ARUBA
D5D	COUNTRY-NICARAGUA
DAA	SUNSHADE-VINYL
DE2	MIRROR O/S-LH & RH, MANUAL CONTROL, FOLDING, COLOR
DE5	MIRROR O/S-LH & RH, REMOTE CONTROL, ELECTRIC, HEATED, FOLDING, COLOR.
DEB	MIRROR O/S-LH & RH, REMOTE CONTROL, ELECTRIC, HEATED, FOLDING, COLOR. SINGLE PANE
DH6	MIRROR I/S FRT VAN-LH & RH, SUNSHADE, ILLUM
DHC	MIRROR O/S-LH & RH, MANUAL CONTROL, AUX WFOV, COLOR
DNS	EQUIPMENT-SUPPLIER INSTALLED
DPU	COUNTRY-BONAIRE
DRJ	MIRROR I/S R/V-TILT, PARTIAL VIDEO DISPLAY
DT4	ASHTRAY-CIGARETTE LIGHTER
E24	DOOR SIDE-REAR, HINGED

E3T	HANDLE-I/S, DOOR RELEASE
E48	COVER-RADIATOR GRILLE OPG - COLD CLIMATE
EF7	COUNTRY-UNITED STATES OF AMERICA (USA)
ENC	HVAC PROVISIONS-AUXILLIARY HEATER PLUMBING & WIRING
EVA	TEST-DVT, EVAP EMISSION REQUIREMENT
EXP	EXPORT-
FE9	CERTIFICATION-EMISSION, FEDERAL
FHO	VEHICLE FUEL-GASOLINE E10
FHS	VEHICLE FUEL-GASOLINE E85
FHX	VEHICLE FUEL-DIESEL B20
FHZ	VEHICLE FUEL-DEDICATED CNG
G7C	PRIMARY COLOR-EXTERIOR, PULL ME OVER RED SOLID (130X)
G7K	EQUIPMENT-ANTENNA, CABLE AND GROUNDPLATE
G80	AXLE POSITRACTION-LIMITED SLIP
GAN	PRIMARY COLOR-EXTERIOR, SWITCHBLADE SILVER MET (G) 636R
GAZ	PRIMARY COLOR-EXTERIOR, SUMMIT WHITE (G) 8624
GBA	PRIMARY COLOR-EXTERIOR, BLACK (G) 8555
GBV	PRIMARY COLOR-EXTERIOR, CYBER GRAY MET (G) 637R
GPA	PRIMARY COLOR-EXTERIOR, GASOLINE MET-2 (457B)
GT4	AXLE REAR-3.73 RATIO
GT5	AXLE REAR-4.10 RATIO
GU6	AXLE REAR-3.42 RATIO
GWX	PRIMARY COLOR-EXTERIOR, SUBTERRANEAN MET (105V)
I17	ENGINEERING YEAR-2017
IVR	VEHICLE-VRIDE
JFF	GVW RATING-10,100 LBS

JH6	BRAKE-HYD POWER, 4 WHL DISC.
JH9	BRAKE-HYD POWER, 4 WHL DISC, 14,200 LBS
JL4	CONTROL,-ACTIVE BRAKE
K05	HEATER ENG-BLOCK
K08	HEATER-AUXILIARY, FUEL FIRED
K34	CRUISE CONTROL-AUTOMATIC, ELECTRONIC
K50	FUEL-FITTING, LINE TAKE-OFF
K68	GENERATOR-105 AMP
KC4	COOLING SYSTEM-ENG OIL
KD1	COOLING SYSTEM-TRANS, OIL
KG4	GENERATOR-150 AMP
KI4	RECEPTACLE-ELECTRICAL, ACCESSORY 110 VOLT
KO7	VEHICLE FUEL-DEDICATED LIQUEFIED PETROLEUM GAS, LIQUID
KUP	THROTTLE CONTROL-ELECTRONIC
KW5	GENERATOR-220 AMP
L20	ENGINE-GAS, 8 CYL, 4.8L, SFI, E85 MAX, IRON, GM
L96	ENGINE-GAS, 8 CYL, 6.0L, SFI, E85 MAX, IRON, GM
LC8	ENGINE-LPG/CNG, 8 CYL, V8, 6.0L, SFI, GEN 1, GMNA
LWN	ENGINE-DIESEL, 2.8L, DI, L4, DOHC, TURBO, XLDE
M5U	TRANSMISSION-AUTO 8 SPD, 8L90
MTF	PROVISIONS-FIRE EXTINGUISHER MOUNTING
MYD	TRANSMISSION-AUTO 6 SPD, HMD, 6L90
N12	EXHAUST SYSTEM-REAR EXIT
N33	STEERING COLUMN-TILT TYPE
NCF	LOCK-CHILD SECURITY FEATURE - NONE
NE1	CERTIFICATION-EMISSION, GEOGRAPHICALLY RESTRICTED REGISTRATION FOR VEHICLES UP TO 14,000 LBS GVW (USE 2003 MDL YR

NE7	FUEL TANK-216L, 57 GAL
NHT	PERFORMANCE PACKAGE-ENHANCED TOWING
NP5	STEERING WHEEL-LEATHER WRAPPED
NPL	PLATE-NAME - NONE
NT7	EMISSION SYSTEM-FEDERAL, TIER 2
NTB	EMISSION SYSTEM-FEDERAL, TIER 3
NU4	EMISSION SYSTEM-CALIFORNIA LEV2 PLUS
NUK	EMISSION SYSTEM-CALIFORNIA, ULEV250
NUM	EMISSION SYSTEM-CALIFORNIA, LEV3 MDV 10-14K GVW
P03	COVER, WHEEL-VAR 3
PNC	PANEL-TRIM, FRT DOORS & SI RR DOOR(S) & RR DOORS
PPC	PANEL-TRIM, RR DOORS
PRP	SALES PACKAGE-COMMERCIAL TRADESMAN
QB5	WHEEL-16 X 6.5, J, STEEL (DO NOT USE AFTER M.Y. 2011)
QT4	WHEEL-16 X 6.5, STEEL H.D. (DO NOT USE AFTER M.Y. 2011)
R04	WHEEL CONFIGURATION-RR, SINGLE (DO NOT USE AFTER M.Y. 2011)
R05	WHEEL CONFIGURATION-RR, DUAL (DO NOT USE AFTER M.Y. 2011)
R25	APPEARANCE PACKAGE-EXTERIOR, CHROME GRILLE & PAINTED BUMPER
R26	APPEARANCE PACKAGE-EXTERIOR, CHROME GRILLE & FRONT BUMPER
RVG	ACCESSORY-ADAPTER - TRAILER HARNESS
RVX	ACCESSORY-BALL MOUNT - TRAILER HITCH
RYS	ACCESSORY-FIRE EXTINGUISHER
RYT	ACCESSORY-FIRST AID KIT
RYY	ACCESSORY-FLOOR MATS - MOLDED VINYL
RZW	ACCESSORY-HARNESS - TRAILER HITCH

S08	ACCESSORY-HIGHWAY SAFETY KIT
S44	ACCESSORY-LOCKING PIN - TRAILER HITCH
S52	ACCESSORY-MOLDED HOOD PROTECTOR - SMOKED
S6N	ACCESSORY-RECEIVER COVER - TRAILER HITCH
S6Q	ACCESSORY-ROADSIDE ASSISTANCE PACKAGE
SAO	ACCESSORY-SMOKERS PACKAGE
SDD	ACCESSORY-TRAILER HITCH - FIXED
SDI	ACCESSORY-TRIANGLE - REFLECTIVE
SDS	ACCESSORY-WEATHER DEFLECTORS - SIDE WINDOW - SMOKED
SFE	ACCESSORY-WHEEL LOCKS
SFV	ACCESSORY-WIRELESS NETWORK INTERFACE MODULE
T74	CONTROL, HEADLAMPS-AUTOMATIC, DELAY
TGA	LANGUAGE CONTROL-ENGLISH, FRENCH, SPANISH
TGG	LANGUAGE CONTROL-ENGLISH, ARABIC, FRENCH
TP2	BATTERY-AUXILIARY (DO NOT USE AFTER 2011 ON NEW/MAJOR PROGS, USE K4B)
TR9	LAMP GROUP-
U05	HORN-DUAL
U0F	RADIO-AM/FM STEREO, CAF, RSA, MUSIC NAVIGATOR, GRAPHICS
U0H	RADIO-AM/FM STEREO, USB, GMNA
U19	SPEEDOMETER-INST, KILO & MILES, KILO ODOMETER
U2J	DIGITAL AUDIO SYSTEM-S-BAND - NONE
U2K	DIGITAL AUDIO SYSTEM-S-BAND
U73	ANTENNA-FIXED, RADIO
U80	DISPLAY-COMPASS
UA1	BATTERY-HIGH CAPACITY, WET (DO NOT USE AFTER 2011 ON NEW/MAJOR PROGS)

VLV	ACCESSORY-LADDER RACK - ROOF MOUNTED - SWING OUT
VLW	ACCESSORY-BULKHEAD DIVIDER WITH DOOR
VP6	NOISE CONTROL-
VPH	VEHICLE PREPARATION-OVERSEAS DELIVERY
VQK	ACCESSORY-SPLASH GUARDS - CUSTOM MOLDED
VR4	TRAILER HITCH-WEIGHT DISTRIBUTING PLATFORM
VR6	HOOK-TIE-DN SHPG
VT7	OWNERS MANUAL-ENGLISH LANGUAGE
VV4	COMMUNICATION EQUIP-MOBILE INTERNET CONNECTIVITY
VXT	VEHICLE TYPE-INCOMPLETE
VXW	ACCESSORY-ASSIST STEPS - MOLDED
W1Y	CONTROL-STEERING WHEEL, RADIO, REDUNDANT CONTROLS
WEN	PLANT CODE-WENTZVILLE, MO, USA
WMH	VIN MODEL YEAR-2017
X88	MARKET BRAND-CHEVROLET
XHF	TIRE FRONT-LT225/75R16 E 115/112 S BL ALS
XIW	TIRE FRONT-LT245/75R16 E 120/116R BW OOR
XL7	FREQUENCIES RATING-315 MHZ, LONG DISTANCE
XL8	FREQUENCIES RATING-433 MHZ
XLP	TIRE FRONT-LT245/75R16 E 120/116 S BW ALS
Y3H	SALES PACKAGE-HANDICAPPED, MOBILITY, PARATRANSIT
YA2	DOOR SIDE-REAR, SLIDING
YB9	PAINT PROCESS-INTERIOR - NONE
YC6	PACKAGE, CONVENIENCE-DECOR LEVEL #6
YF1	SALES PACKAGE-CUTAWAY UPFITTER
YF2	SALES PACKAGE-AMBULANCE UPFITTER

YF5	CERTIFICATION-EMISSION, CALIFORNIA
YHF	TIRE REAR-LT225/75R16 E 115/112 S BL ALS
YIW	TIRE REAR-LT245/75R16 E 120/116R BW OOR
YLP	TIRE REAR-LT245/75R16 E 120/116 S BW ALS
YM8	IDENTIFICATION-LIMITED PERSONALIZATION OPTION (LPO)
Z49	COUNTRY-CANADA
Z82	TRAILER PROVISIONS-SPECIAL EQUIPMENT, H.D.
Z88	MARKET BRAND-GMC
ZHF	TIRE SPARE-LT225/75R16 E 115/112 S BL ALS
ZIW	TIRE SPARE-LT245/75R16 E 120/116R BW OOR
ZLP	TIRE SPARE-LT245/75R16 E 120/116 S BW ALS
ZP0	SEATING ARRANGEMENT-TEMPORARY DRIVER
ZP3	SEATING ARRANGEMENT-15 PASS
ZP6	SEATING ARRANGEMENT-5 PASS CARGO
ZP8	SEATING ARRANGEMENT-8 PASS
ZQ2	SALES PACKAGE-DRIVER CONVENIENCE
ZQ3	SALES PACKAGE-DRIVER CONVENIENCE II
ZR7	APPEARANCE PACKAGE-GRILLE & BUMPER CHROME
ZW2	WINDOW PKG-RR DRS
ZW3	WINDOW PKG-RR DRS, SIDE RR DR
ZW4	WINDOW PKG-RH SIDE, RR DRS
ZW6	WINDOW PKG-COMPLETE BODY
ZW9	BODY EQUIPMENT-BASE BODY OR CHASSIS
ZX1	SEATING ARRANGEMENT-DRIVER ONLY, HIGH BACK
ZX2	SEATING ARRANGEMENT-DRIVER & PASS, HIGH BACK

ZX5	SEATING ARRANGEMENT-12 PASS
ZX9	TIRE SPARE-W/WHEEL - NONE
ZY1	COLOR COMBINATION-SOLID

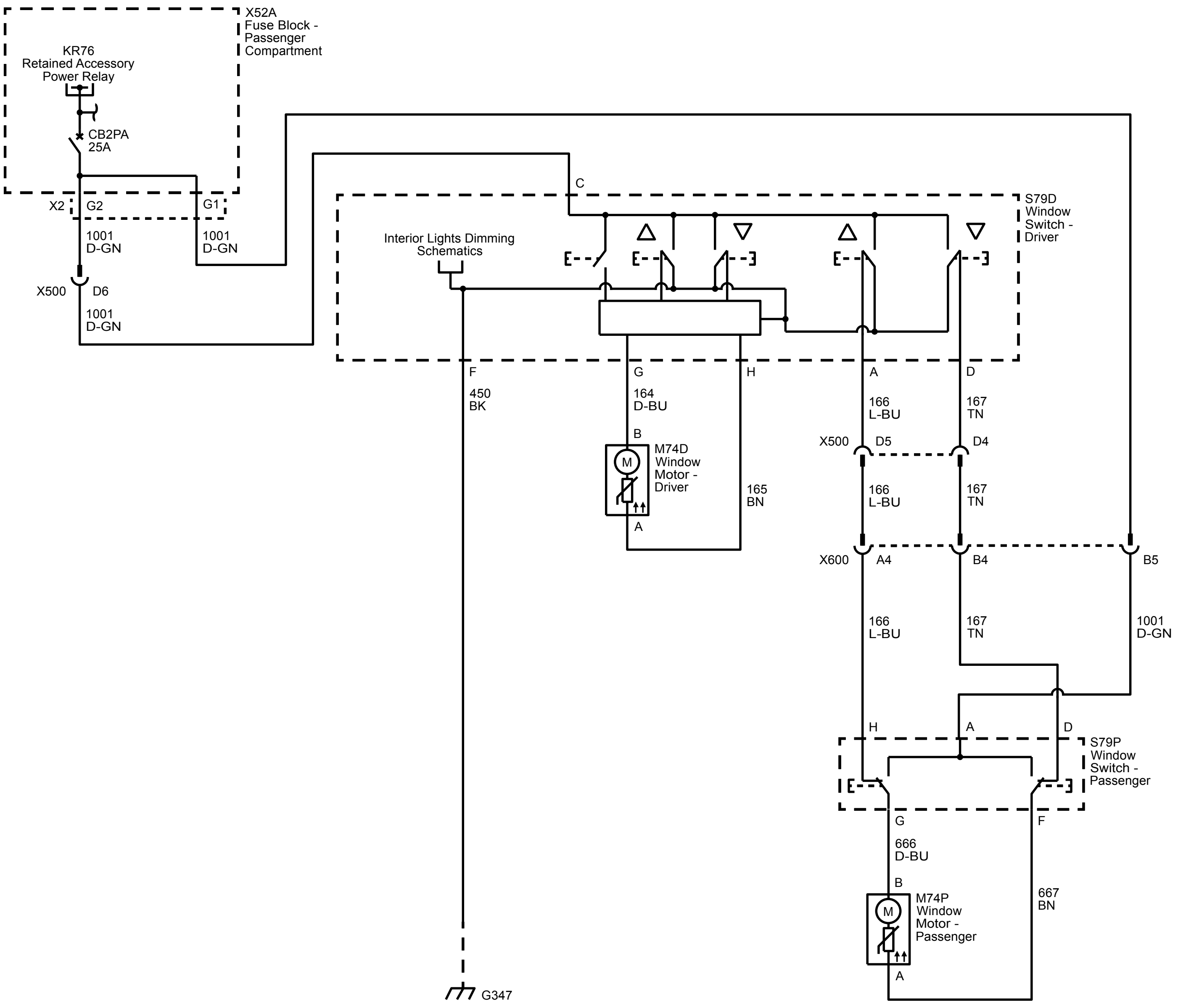
Body Systems

Fixed and Moveable Windows

Schematic and Routing Diagrams

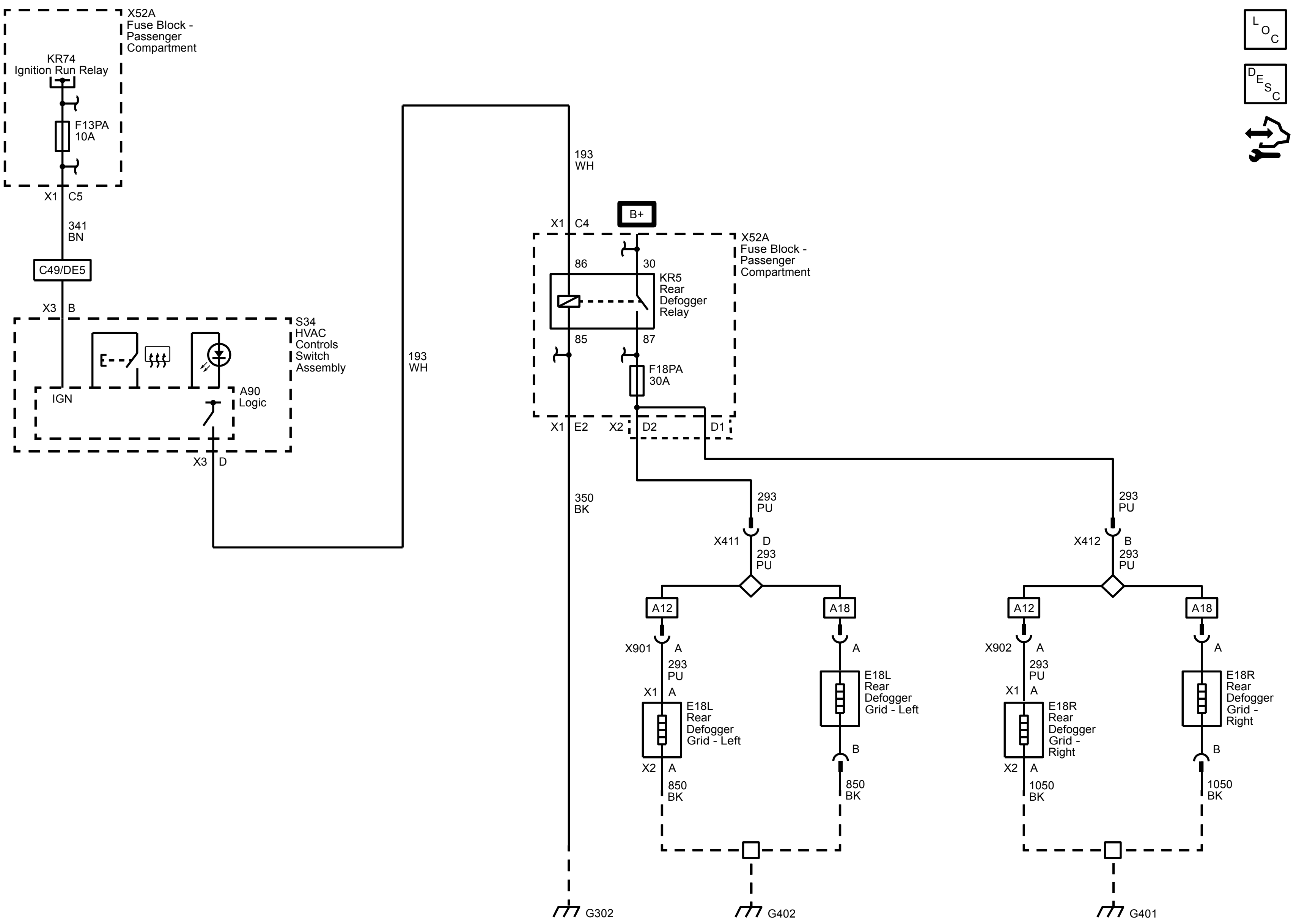
Moveable Window Schematics

Moveable Windows (A31)


X52A
Fuse Block -
Passenger
Compartment
KR76
Retained Accessory
Power Relay
CB2PA
25A
X2
G2
G1
1001
D-GN
1001
D-GN
X500
D6
1001
D-GN
C
S79D
Window
Switch -
Driver
Interior Lights Dimming
Schematics
F
G
H
A
D
450
BK
164
D-BU
B
M
M74D
Window
Motor -
Driver
A
165
BN
166
L-BU
167
TN
X500
D5
D4
166
L-BU
167
TN
X600
A4
B4
B5
166
L-BU
167
TN
1001
D-GN
H
A
D
S79P
Window
Switch -
Passenger
G
F
666
D-BU
B
M
M74P
Window
Motor -
Passenger
A
667
BN
G347

Defogger Schematics

Defogger (C49)


X52A
Fuse Block - Passenger Compartment
KR74
Ignition Run Relay
F13PA
10A
X1
C5
341
BN
C49/DE5
X3
B
S34
HVAC Controls Switch Assembly
IGN
A90
Logic
X3
D
193
WH
193
WH
B+
X1
C4
86
30
KR5
Rear Defogger Relay
X52A
Fuse Block - Passenger Compartment
85
87
F18PA
30A
X1
E2
X2
D2
D1
350
BK
293
PU
293
PU
X411
D
293
PU
X412
B
293
PU
A12
A18
A12
A18
X901
A
293
PU
X1
A
E18L
Rear Defogger Grid - Left
A
E18L
Rear Defogger Grid - Left
B
X2
A
850
BK
850
BK
X902
A
293
PU
X1
A
E18R
Rear Defogger Grid - Right
A
E18R
Rear Defogger Grid - Right
B
X2
A
1050
BK
1050
BK
G302
G402
G401
LOC
DESC

Description and Operation

Power Windows Description and Operation

Power Window System Components

The power window system consists of the following components:

- LF power window master switch
- RF power window switch
- Reversible power window motors in each of the doors (circuit breaker protected)
- PWR WNDW 25A circuit breaker

Power Window System Controls

The power window system will operate anytime the ignition switch is in the ACCY or ON position or when RAP is activated.

The LF power window master switch can control the up and down functions of both the windows in the vehicle. The passenger door power window switch can only control the up and down functions of the passenger window.

Power Window Motor Operation

A permanent magnet motor operates each of the power side windows. Each motor raises or lowers the glass when the motor receives voltage. The direction the motor turns depends on the polarity of the supply voltage. The power window switches control the polarity of the supply voltage. A built-in circuit breaker protects each motor. The circuit breaker opens when the switch is depressed for a extended period of time under the following conditions:

- The window has an obstruction.
- The window is fully open or fully closed.

The circuit breaker will reset automatically as the circuit breaker cools.

Power Window Operation

The normally closed contacts of the switch are connected to ground and the center pole is connected to the accessory voltage circuit. By placing the left power window switch in the down position, voltage is applied to the power window motor left front down circuit and to the power window motor. The other side of the power window motor is connected to ground through the normally closed contacts of the left power window switch through the power window motor left front up circuit and drives the window down.

By placing the power window switch in the up position the polarity of the motor is reversed and the motor drives the window up.

Rear Window Defogger Description and Operation

Rear Window Defogger System Components

The rear window defogger system consists of the following components:

- HVAC control assembly
- Rear window defogger relay
- Rear window defogger grid

Rear Window Defogger Operation

When you turn the ignition to the ON position, battery positive voltage is supplied through the HTD MIR DEFOG fuse to the rear window defogger relay switched input. Ground is for the rear window defogger relay coil is provided by G302. Battery positive voltage and ignition voltage is supplied to the HVAC control assembly for rear window defogger operation. When the rear window defogger switch is depressed, the HVAC control assembly energizes the rear window defogger relay by supplying battery positive voltage to the rear window defogger relay coil. This allows battery positive voltage from the relay switched input through the switch contacts and out the relay switched output to the rear window defogger grids. The HVAC control assembly also illuminates the rear window defogger indicator upon this request. Ground for the left rear window defogger grid is provided by G401. Ground for the right rear window defogger grid is provided by G402.

When you turn ON the ignition and press the rear window defogger switch for the first time, the defogger cycle lasts 10 minutes. Further operation results in 5 minute defogger cycles. The defogger cycle resets to 10 minutes when you cycle the ignition to the OFF position and then back to the ON position.

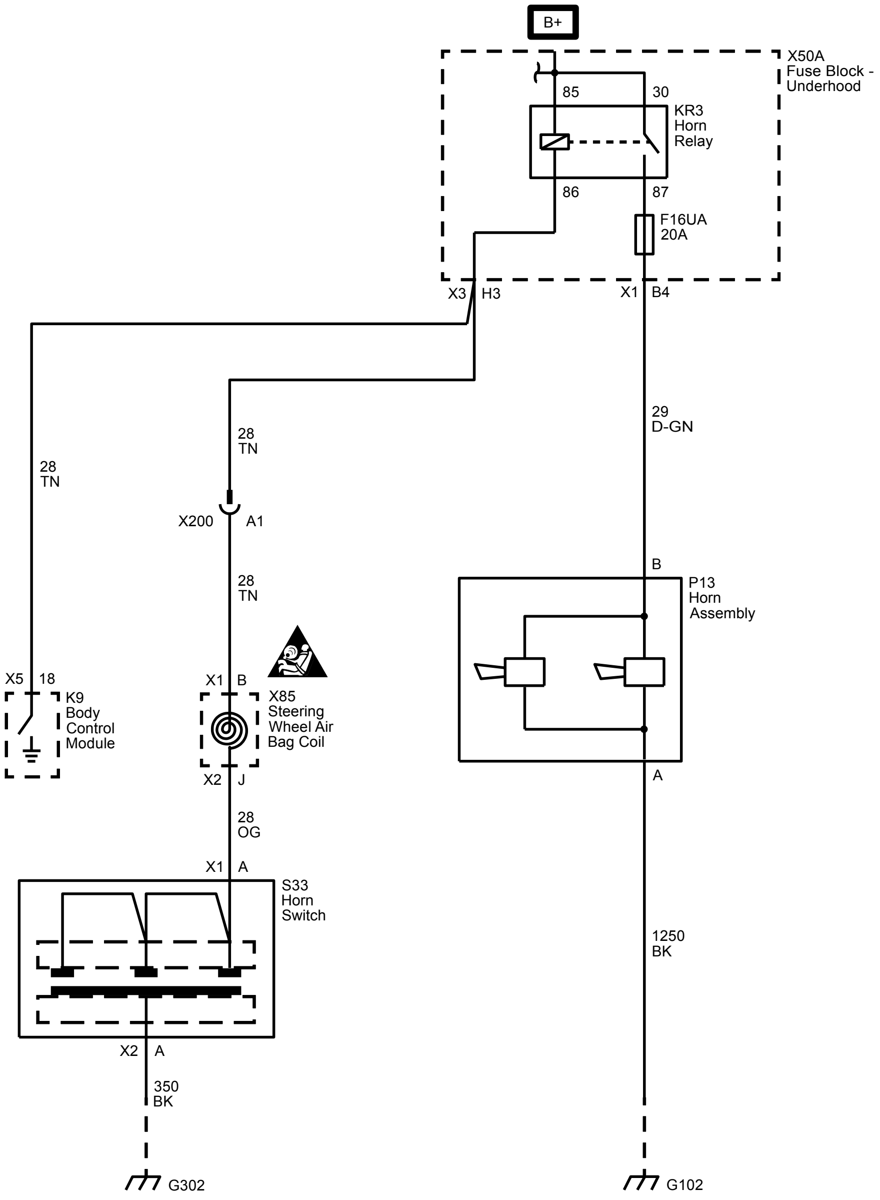
Body Systems

Horns and Pedestrian Alerts

Schematic and Routing Diagrams

Horn Schematics

Horn Schematics


B+
X50A
Fuse Block -
Underhood
85
30
KR3
Horn
Relay
86
87
F16UA
20A
X3
H3
X1
B4
28
TN
28
TN
X200
A1
28
TN
29
D-GN
B
P13
Horn
Assembly
A
X5
18
K9
Body
Control
Module
X1
B
X85
Steering
Wheel Air
Bag Coil
X2
J
28
OG
X1
A
S33
Horn
Switch
X2
A
350
BK
G302
1250
BK
G102

Description and Operation

Horns System Description and Operation

System Description

The horn system consists of the following components:

- The HORN fuse
- The Horn relay
- The Horn Contact
- The Horn Assembly
- Body Control Module (BCM)

System Operation

- The vehicle horns are activated whenever the horn switch is depressed.
- The BCM commands the horns ON under any of the following conditions:
    - When the panic button is depressed on the remote control door lock transmitter. For further information refer to Keyless Entry System Description and Operation.
    - When the keyless entry system is used to lock the vehicle, a horn chirp may sound to notify the driver that the vehicle has been locked. The notification feature may be enabled or disabled through personalization. For further information refer to Keyless Entry System Description and Operation.

Circuit Operation

Battery positive voltage is applied at all times to the horn relay coil and the horn relay switch. Pressing the horn switch applies ground to the horn relay control circuit. When the horn relay control circuit is grounded, the horn relay is energized and battery positive voltage is applied to the horns through the horn control circuit. The horns sound as long as ground is applied to the horn relay control circuit.

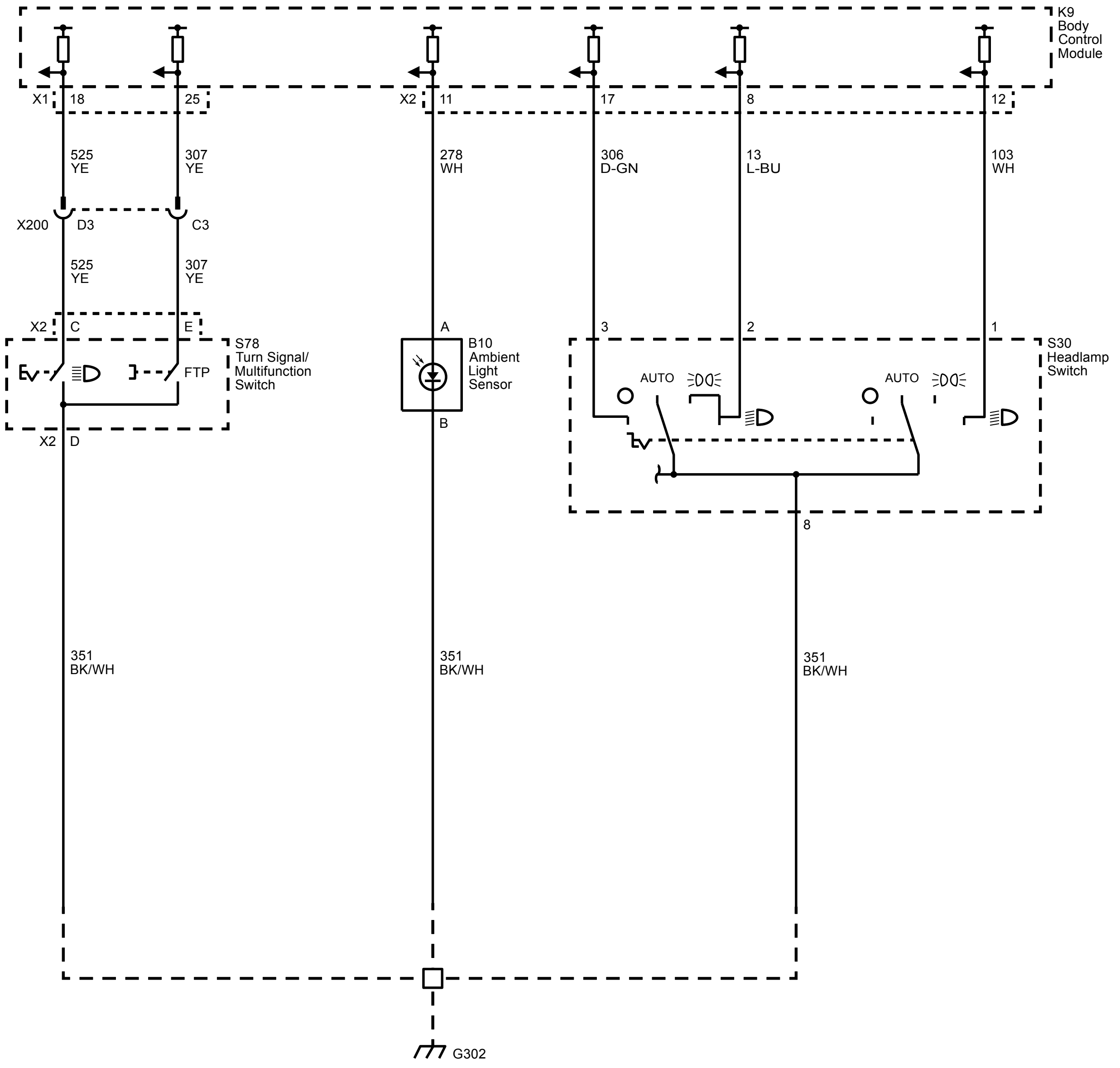
Body Systems

Lighting

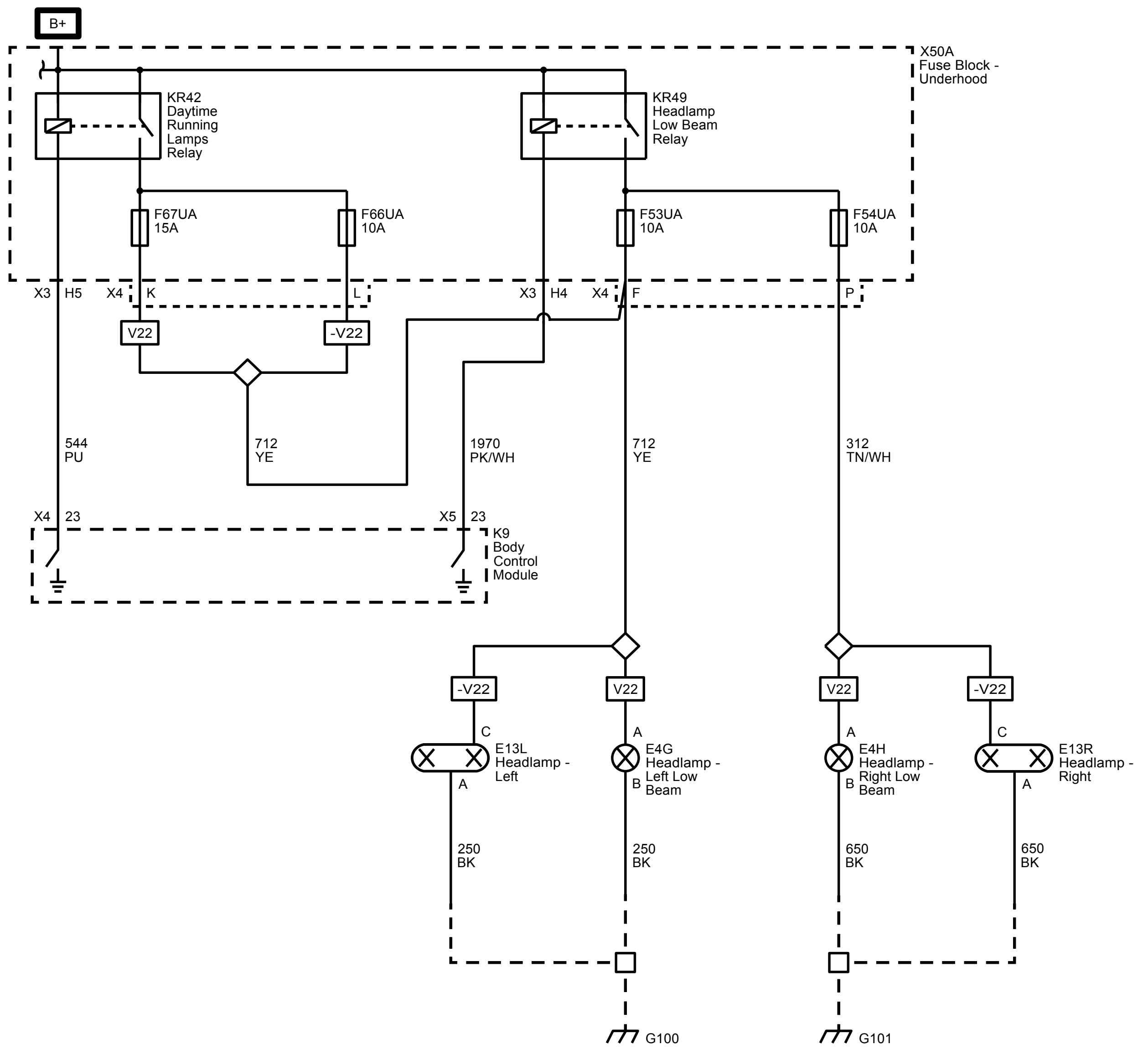
Schematic and Routing Diagrams

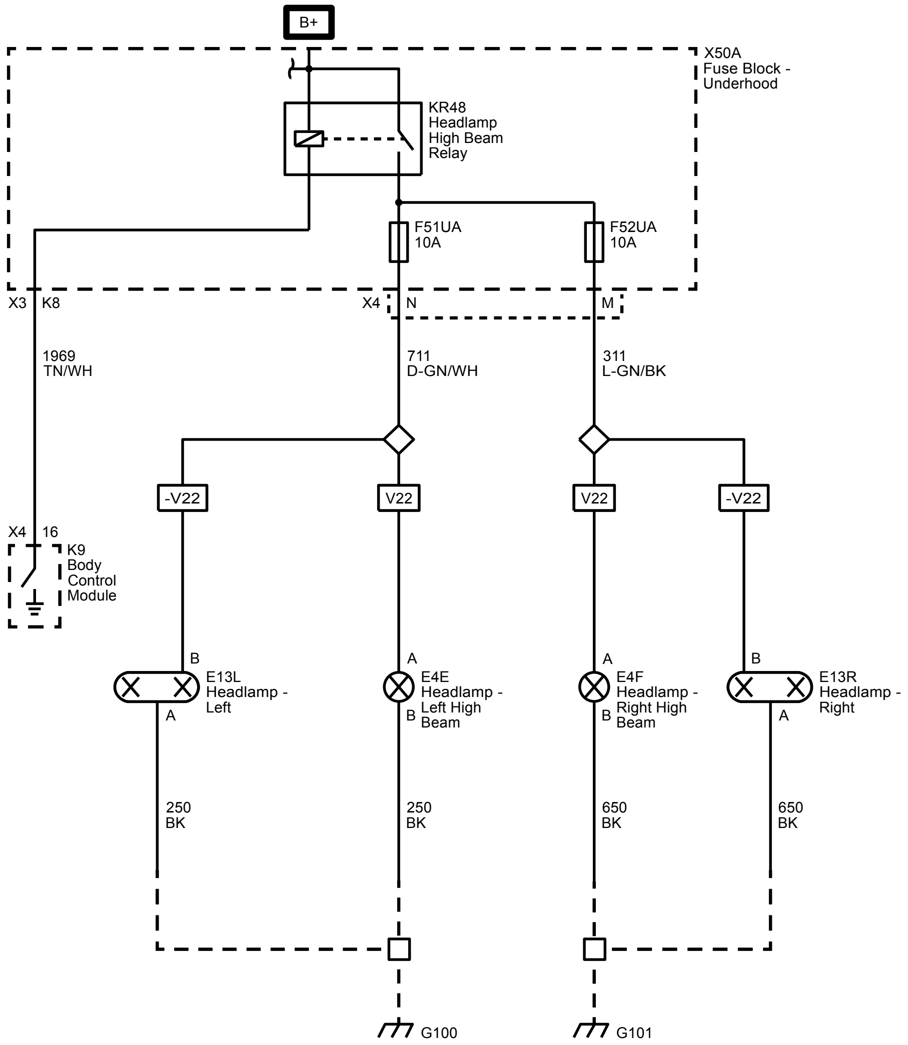
Headlights/Daytime Running Lights (DRL) Schematics

Headlamp and Daytime Running Lamp Controls

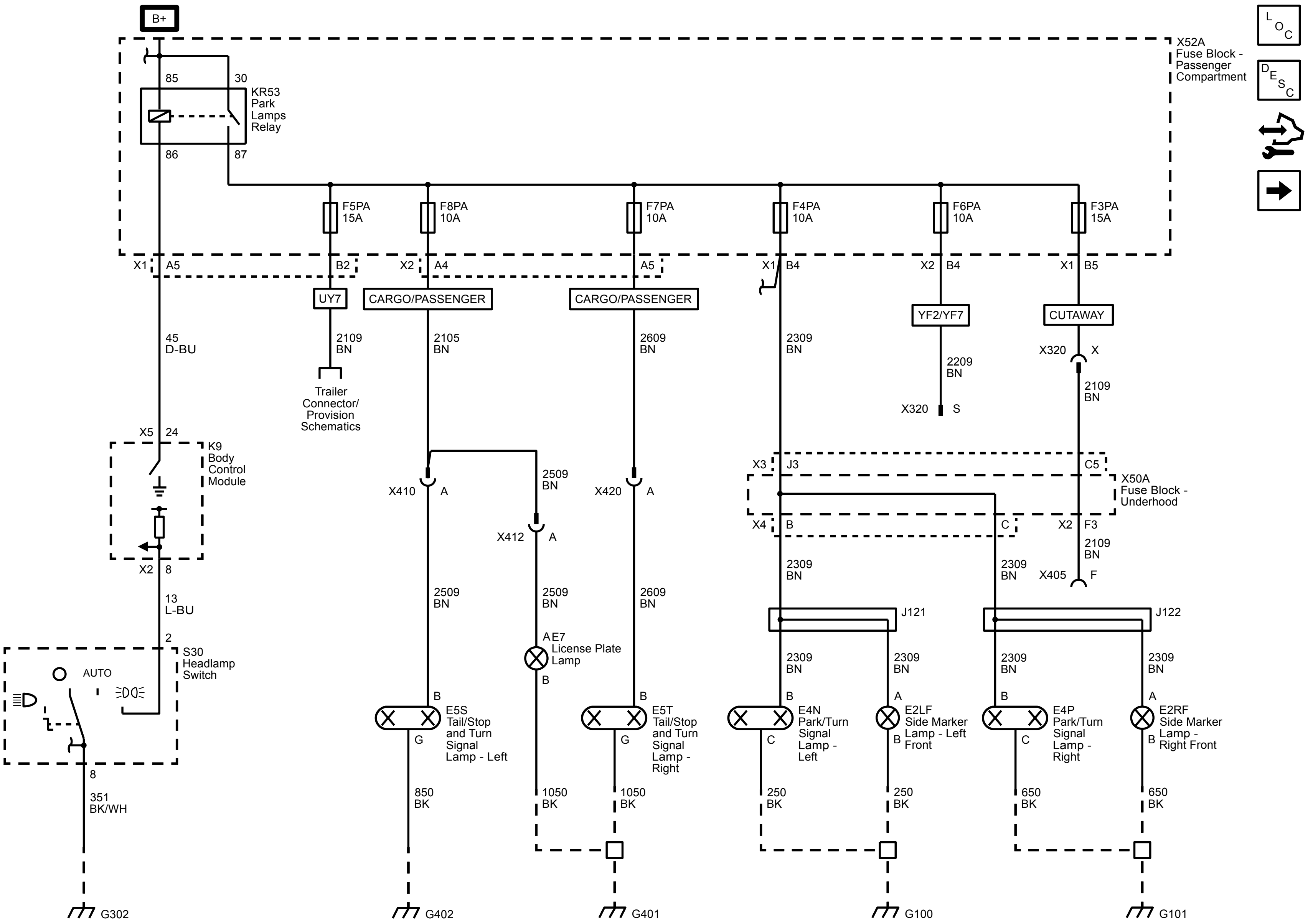

K9
Body
Control
Module
X1
18
25
X2
11
17
8
12
525
YE
307
YE
278
WH
306
D-GN
13
L-BU
103
WH
X200
D3
C3
525
YE
307
YE
X2
C
E
S78
Turn Signal/
Multifunction
Switch
FTP
X2
D
A
B10
Ambient
Light
Sensor
B
3
2
1
S30
Headlamp
Switch
AUTO
AUTO
8
351
BK/WH
351
BK/WH
351
BK/WH
G302

Low Beam and Daytime Running Lights (DRL)

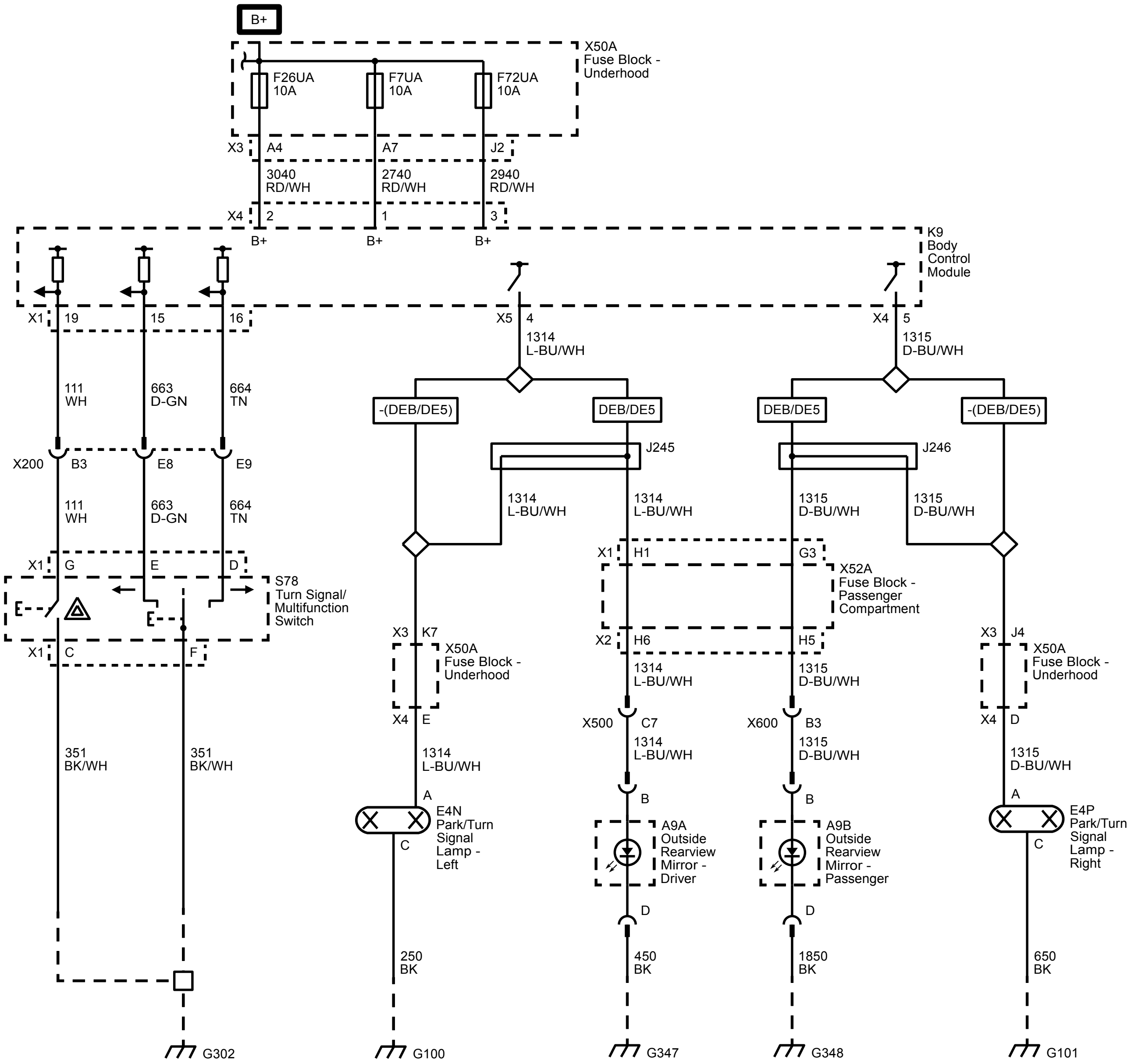

B+
X50A
Fuse Block -
Underhood
KR42
Daytime
Running
Lamps
Relay
KR49
Headlamp
Low Beam
Relay
F67UA
15A
F66UA
10A
F53UA
10A
F54UA
10A
X3 H5
X4 K
L
X3 H4
X4 F
P
V22
-V22
544
PU
712
YE
1970
PK/WH
712
YE
312
TN/WH
X4 23
X5 23
K9
Body
Control
Module
-V22
V22
V22
-V22
C
E13L
Headlamp -
Left
A
A
E4G
Headlamp -
Left Low
Beam
B
A
E4H
Headlamp -
Right Low
Beam
B
C
E13R
Headlamp -
Right
A
250
BK
250
BK
650
BK
650
BK
G100
G101


B+
X50A
Fuse Block - Underhood
KR48
Headlamp
High Beam
Relay
F51UA
10A
F52UA
10A
X3
K8
X4
N
M
1969
TN/WH
711
D-GN/WH
311
L-GN/BK
-V22
V22
V22
-V22
X4
16
K9
Body
Control
Module
B
E13L
Headlamp -
Left
A
A
E4E
Headlamp -
Left High
Beam
B
A
E4F
Headlamp -
Right High
Beam
B
B
E13R
Headlamp -
Right
A
250
BK
250
BK
650
BK
650
BK
G100
G101

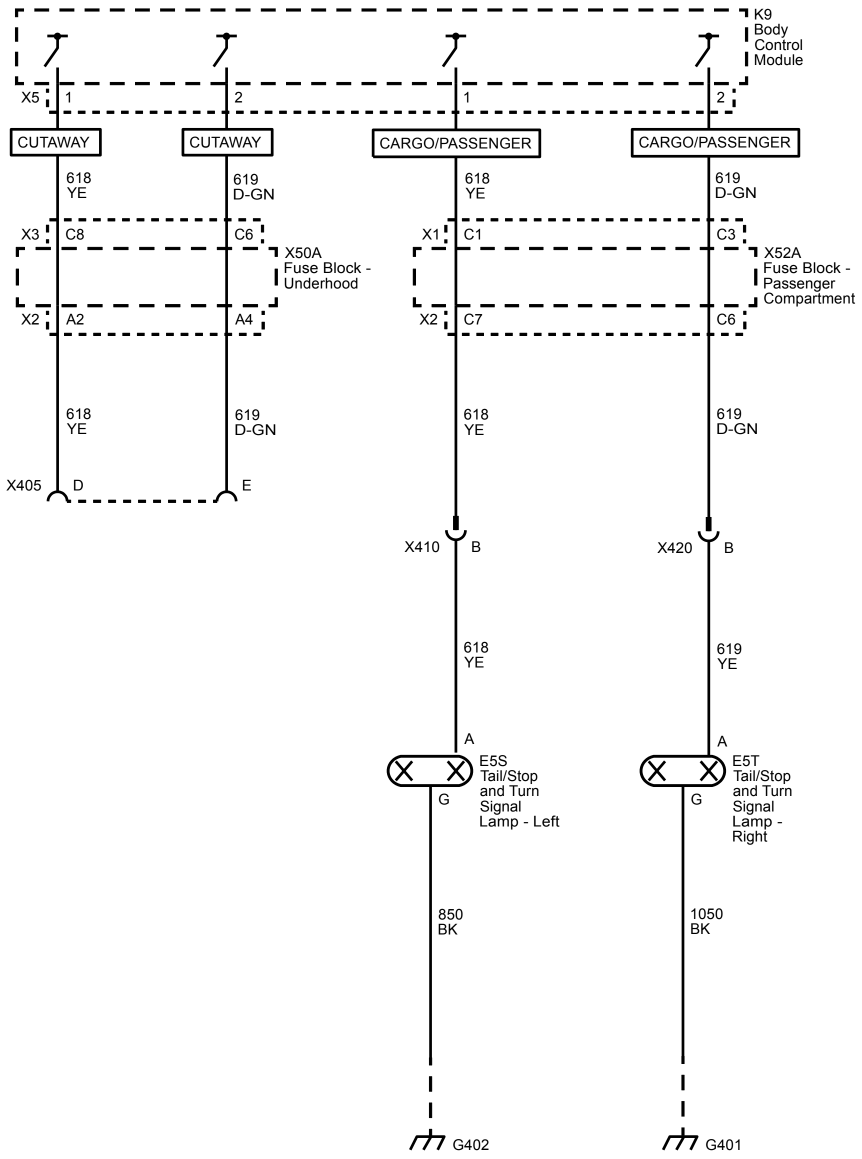
Park Lamp Controls and Park Lamps


B+
X52A Fuse Block - Passenger Compartment
85
30
KR53 Park Lamps Relay
86
87
F5PA 15A
F8PA 10A
F7PA 10A
F4PA 10A
F6PA 10A
F3PA 15A
X1 A5
B2
X2 A4
A5
X1 B4
X2 B4
X1 B5
UY7
CARGO/PASSENGER
CARGO/PASSENGER
YF2/YF7
CUTAWAY
45 D-BU
2109 BN
Trailer Connector/ Provision Schematics
2105 BN
2609 BN
2309 BN
2209 BN
X320 S
X320 X
2109 BN
X5 24
K9 Body Control Module
X2 8
13 L-BU
2
S30 Headlamp Switch
AUTO
8
351 BK/WH
X410 A
2509 BN
X412 A
X420 A
X3 J3
C5
X50A Fuse Block - Underhood
X4 B
C
X2 F3
2109 BN
X405 F
2309 BN
2309 BN
J121
J122
2509 BN
2509 BN
2609 BN
AE7 License Plate Lamp
B
B
E5S Tail/Stop and Turn Signal Lamp - Left
G
B
E5T Tail/Stop and Turn Signal Lamp - Right
G
2309 BN
2309 BN
B
E4N Park/Turn Signal Lamp - Left
C
A
E2LF Side Marker Lamp - Left Front
B
2309 BN
2309 BN
B
E4P Park/Turn Signal Lamp - Right
C
A
E2RF Side Marker Lamp - Right Front
B
850 BK
1050 BK
1050 BK
250 BK
250 BK
650 BK
650 BK
G302
G402
G401
G100
G101
L O C
D E S C

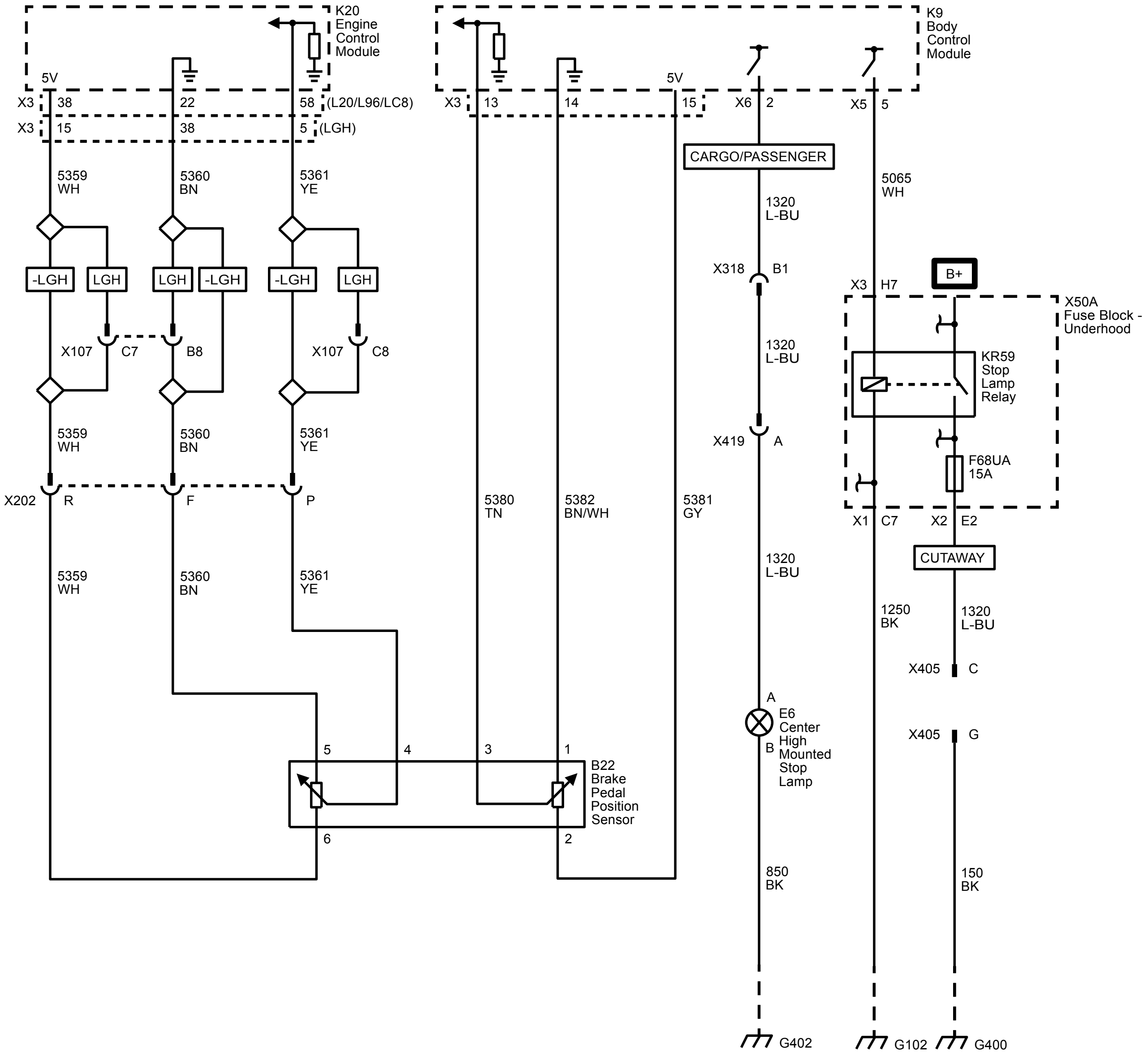
Turn Signal Controls and Front Turn Signal Lamps


B+
X50A
Fuse Block -
Underhood
F26UA
10A
F7UA
10A
F72UA
10A
X3
A4
A7
J2
3040
RD/WH
2740
RD/WH
2940
RD/WH
X4
2
1
3
B+
B+
B+
K9
Body
Control
Module
X1
19
15
16
X5
4
X4
5
1314
L-BU/WH
1315
D-BU/WH
111
WH
663
D-GN
664
TN
-(DEB/DE5)
DEB/DE5
DEB/DE5
-(DEB/DE5)
J245
J246
X200
B3
E8
E9
111
WH
663
D-GN
664
TN
1314
L-BU/WH
1314
L-BU/WH
1315
D-BU/WH
1315
D-BU/WH
X1
G
E
D
S78
Turn Signal/
Multifunction
Switch
X1
H1
G3
X52A
Fuse Block -
Passenger
Compartment
X2
H6
H5
X1
C
F
X3
K7
X50A
Fuse Block -
Underhood
X4
E
X3
J4
X50A
Fuse Block -
Underhood
X4
D
1314
L-BU/WH
1315
D-BU/WH
X500
C7
X600
B3
351
BK/WH
351
BK/WH
1314
L-BU/WH
1314
L-BU/WH
1315
D-BU/WH
1315
D-BU/WH
A
E4N
Park/Turn
Signal
Lamp -
Left
C
B
A9A
Outside
Rearview
Mirror -
Driver
B
A9B
Outside
Rearview
Mirror -
Passenger
A
E4P
Park/Turn
Signal
Lamp -
Right
C
D
D
250
BK
450
BK
1850
BK
650
BK
G302
G100
G347
G348
G101

Rear Turn Signal Lamps

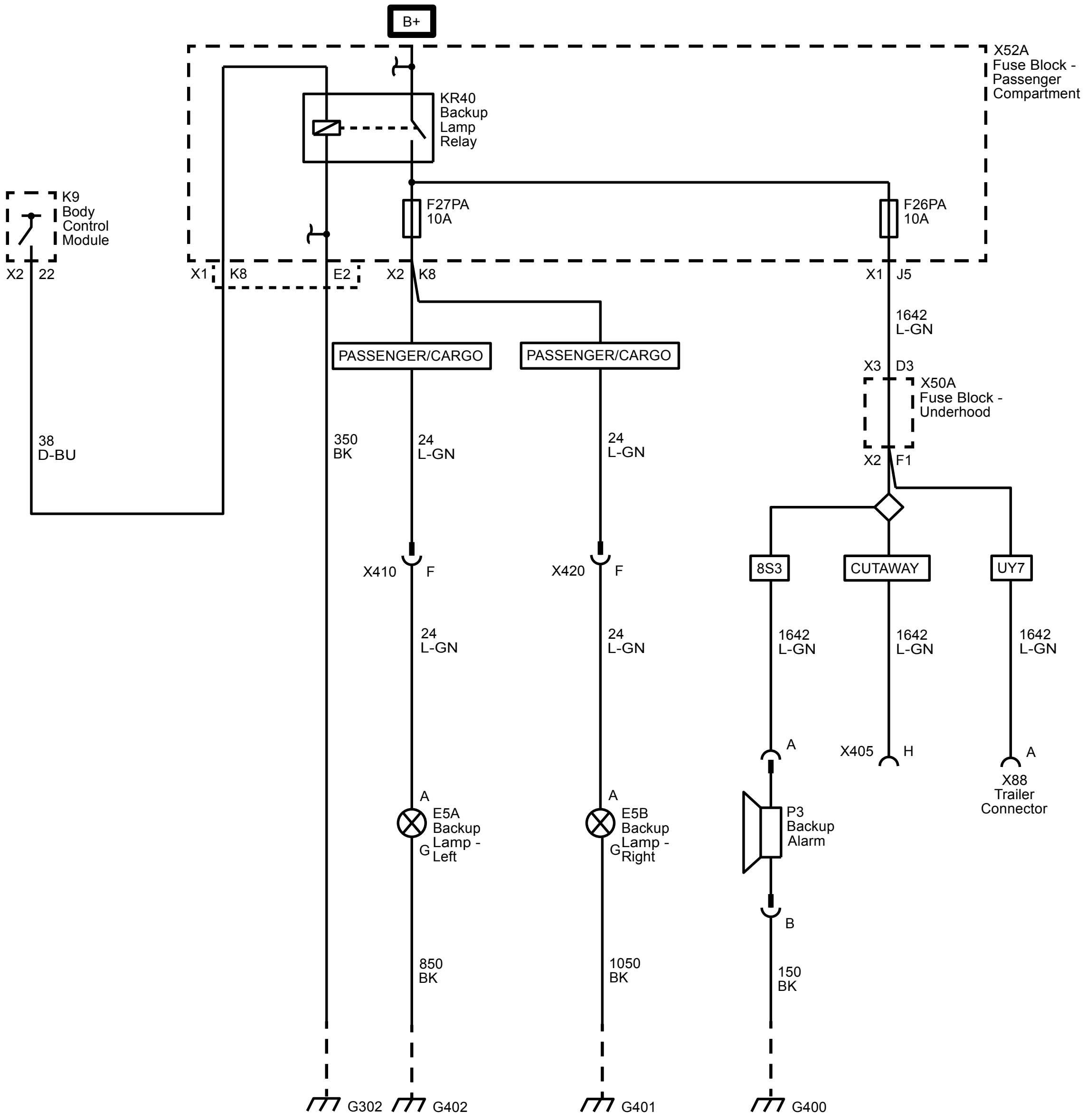

K9
Body
Control
Module
X5
1
2
1
2
CUTAWAY
CUTAWAY
CARGO/PASSENGER
CARGO/PASSENGER
618
YE
619
D-GN
618
YE
619
D-GN
X3
C8
C6
X50A
Fuse Block -
Underhood
X1
C1
C3
X52A
Fuse Block -
Passenger
Compartment
X2
A2
A4
X2
C7
C6
618
YE
619
D-GN
618
YE
619
D-GN
X405
D
E
X410
B
X420
B
618
YE
619
YE
A
E5S
Tail/Stop
and Turn
Signal
Lamp - Left
G
A
E5T
Tail/Stop
and Turn
Signal
Lamp -
Right
G
850
BK
1050
BK
G402
G401

Stop Lamp Controls and CHMSL

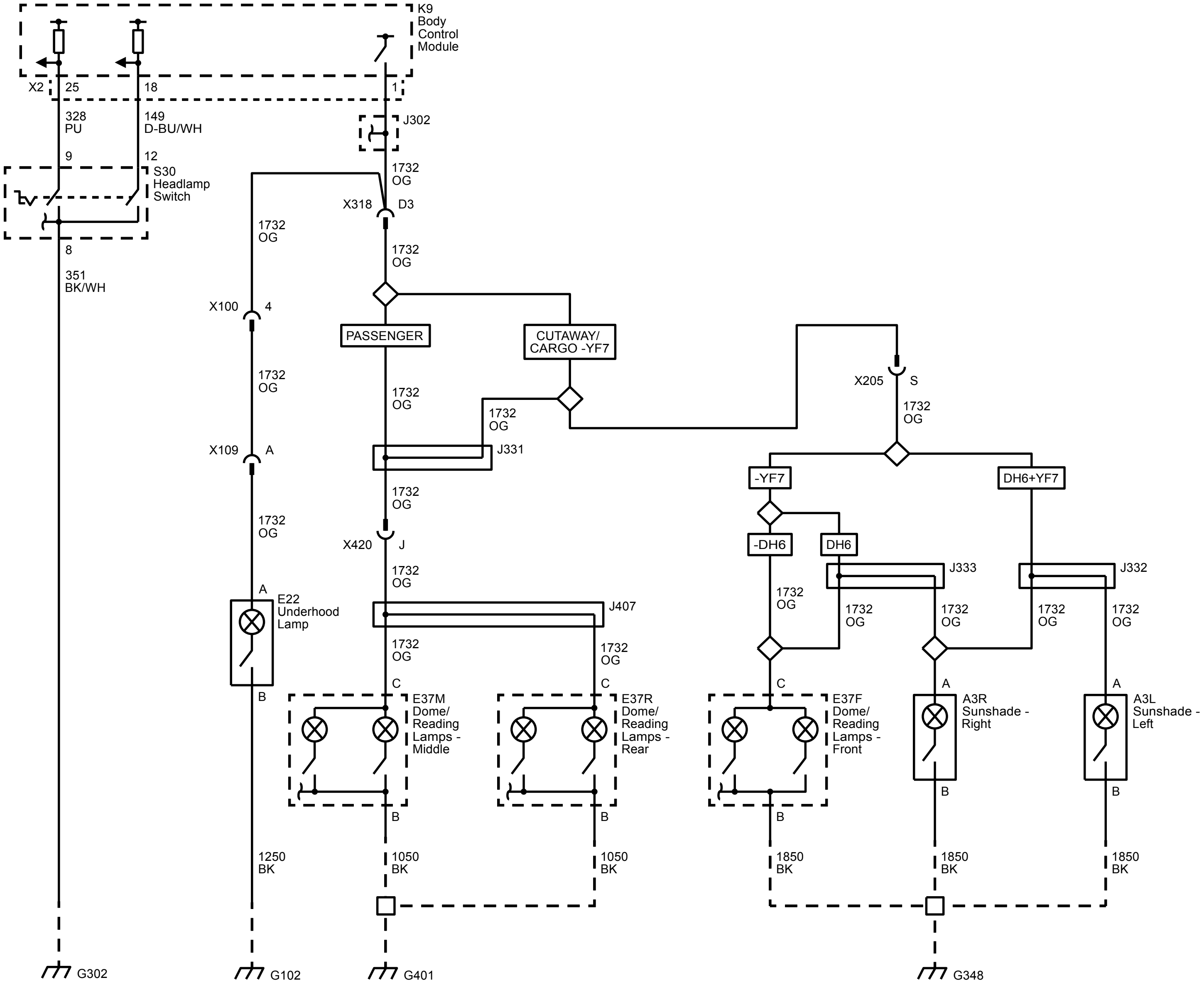

K20
Engine
Control
Module
5V
X3
38
22
58
(L20/L96/LC8)
X3
15
38
5
(LGH)
5359
WH
5360
BN
5361
YE
-LGH
LGH
LGH
-LGH
-LGH
LGH
X107
C7
B8
X107
C8
5359
WH
5360
BN
5361
YE
X202
R
F
P
5359
WH
5360
BN
5361
YE
5
4
3
1
6
2
B22
Brake
Pedal
Position
Sensor
K9
Body
Control
Module
5V
X3
13
14
15
X6
2
X5
5
5380
TN
5382
BN/WH
5381
GY
CARGO/PASSENGER
1320
L-BU
X318
B1
1320
L-BU
X419
A
1320
L-BU
A
E6
Center
High
Mounted
Stop
Lamp
B
850
BK
G402
5065
WH
B+
X3
H7
X50A
Fuse Block -
Underhood
KR59
Stop
Lamp
Relay
F68UA
15A
X1
C7
X2
E2
CUTAWAY
1250
BK
1320
L-BU
X405
C
X405
G
150
BK
G102
G400

LOC
DESC

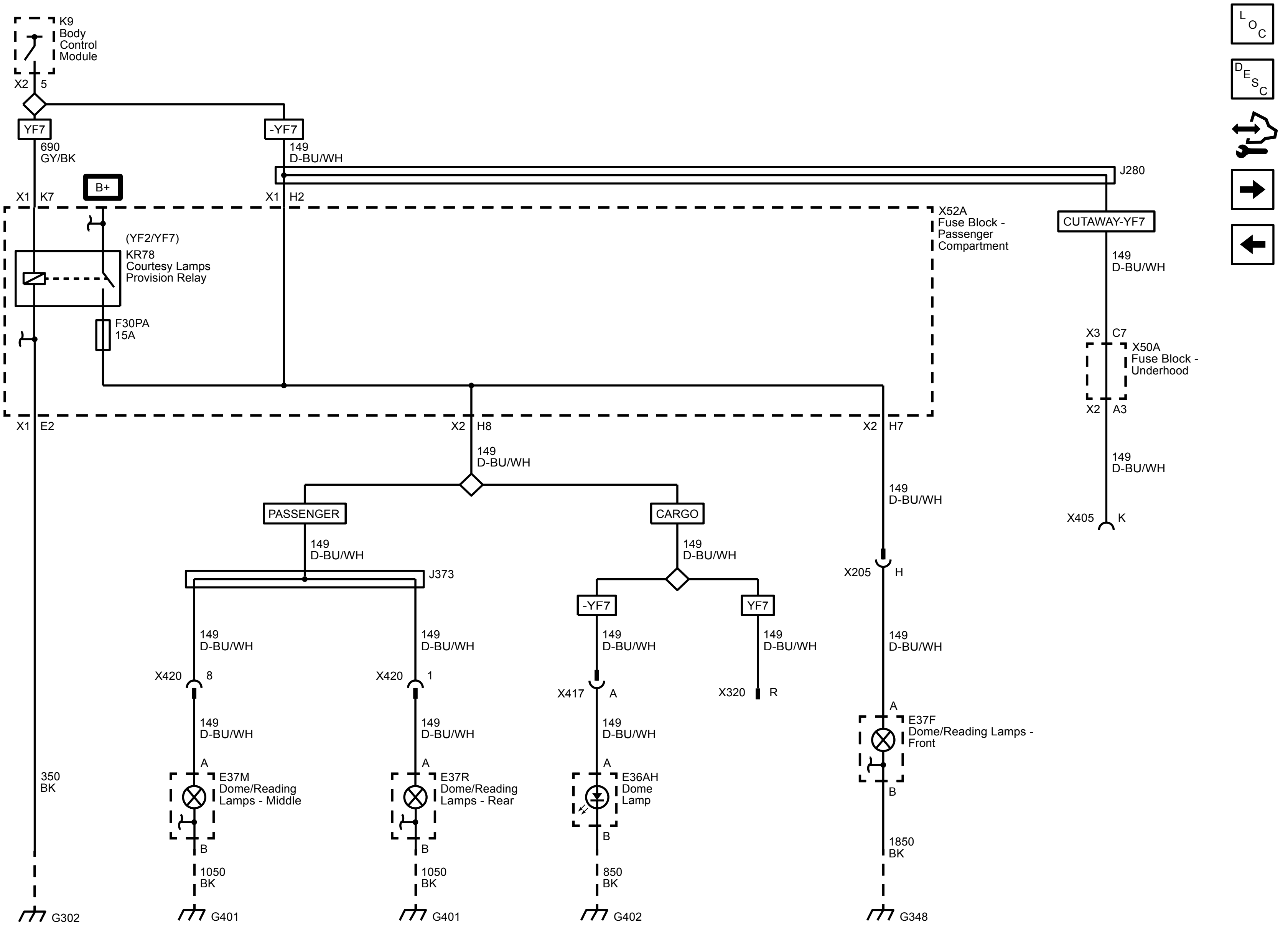
Backup Lamps and Backup Alarm


B+
X52A
Fuse Block - Passenger Compartment
KR40
Backup Lamp Relay
F27PA
10A
F26PA
10A
K9
Body Control Module
X2
22
X1
K8
E2
X2
K8
X1
J5
1642
L-GN
X3
D3
X50A
Fuse Block - Underhood
X2
F1
PASSENGER/CARGO
PASSENGER/CARGO
38
D-BU
350
BK
24
L-GN
24
L-GN
X410
F
X420
F
8S3
CUTAWAY
UY7
24
L-GN
24
L-GN
1642
L-GN
1642
L-GN
1642
L-GN
A
X405
H
A
X88
Trailer Connector
A
E5A
Backup Lamp - Left
G
A
E5B
Backup Lamp - Right
G
P3
Backup Alarm
B
850
BK
1050
BK
150
BK
G302
G402
G401
G400

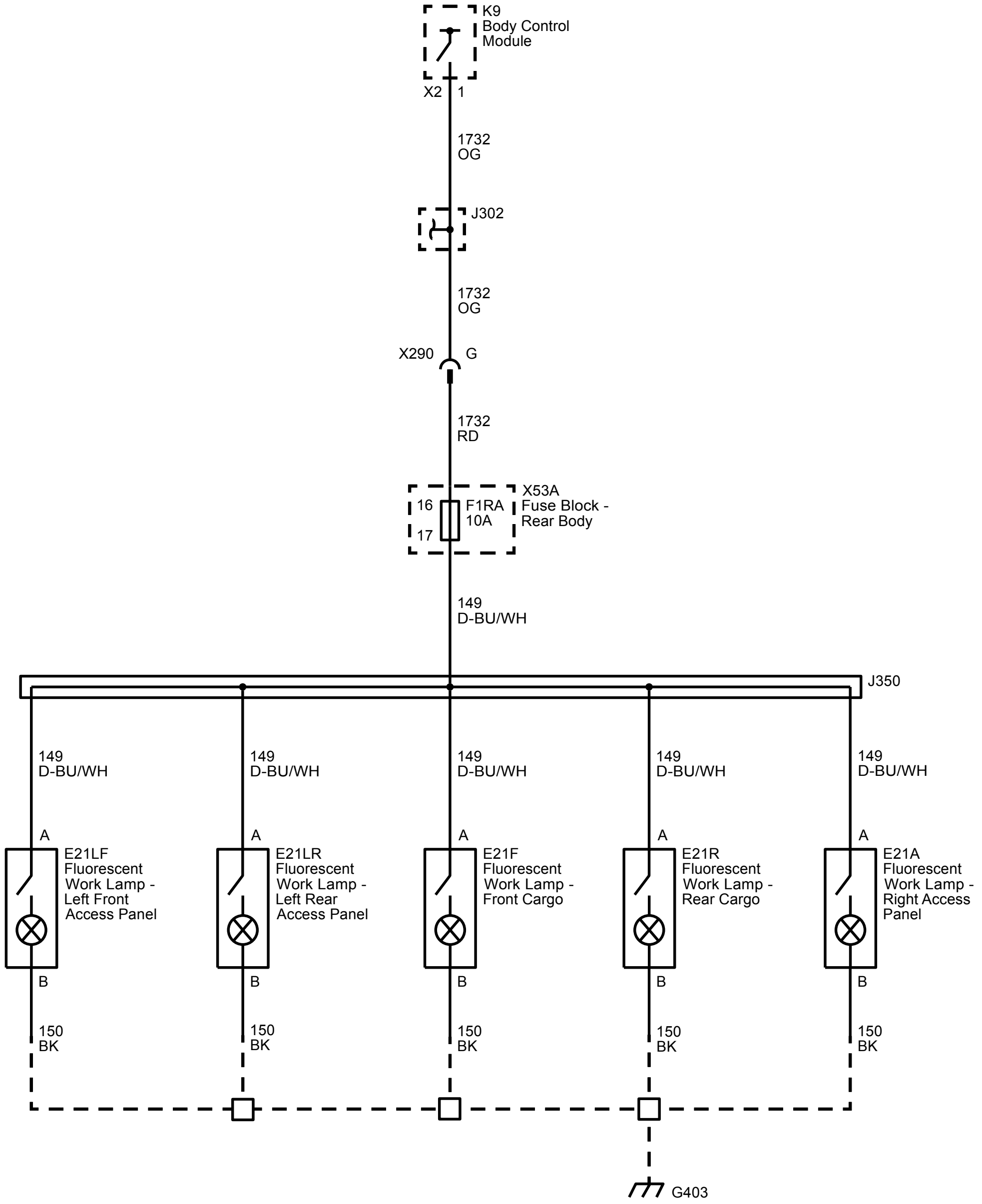
Inadvertent Lamp Control


K9 Body Control Module
X2
25
18
1
328 PU
149 D-BU/WH
J302
9
12
S30 Headlamp Switch
8
351 BK/WH
1732 OG
X318
D3
X100
4
PASSENGER
CUTAWAY/ CARGO -YF7
X205
S
X109
A
J331
-YF7
DH6+YF7
-DH6
DH6
J333
J332
X420
J
J407
E22 Underhood Lamp
B
C
E37M Dome/ Reading Lamps - Middle
E37R Dome/ Reading Lamps - Rear
E37F Dome/ Reading Lamps - Front
A3R Sunshade - Right
A3L Sunshade - Left
1250 BK
1050 BK
1850 BK
G302
G102
G401
G348

Courtesy Lamp Control

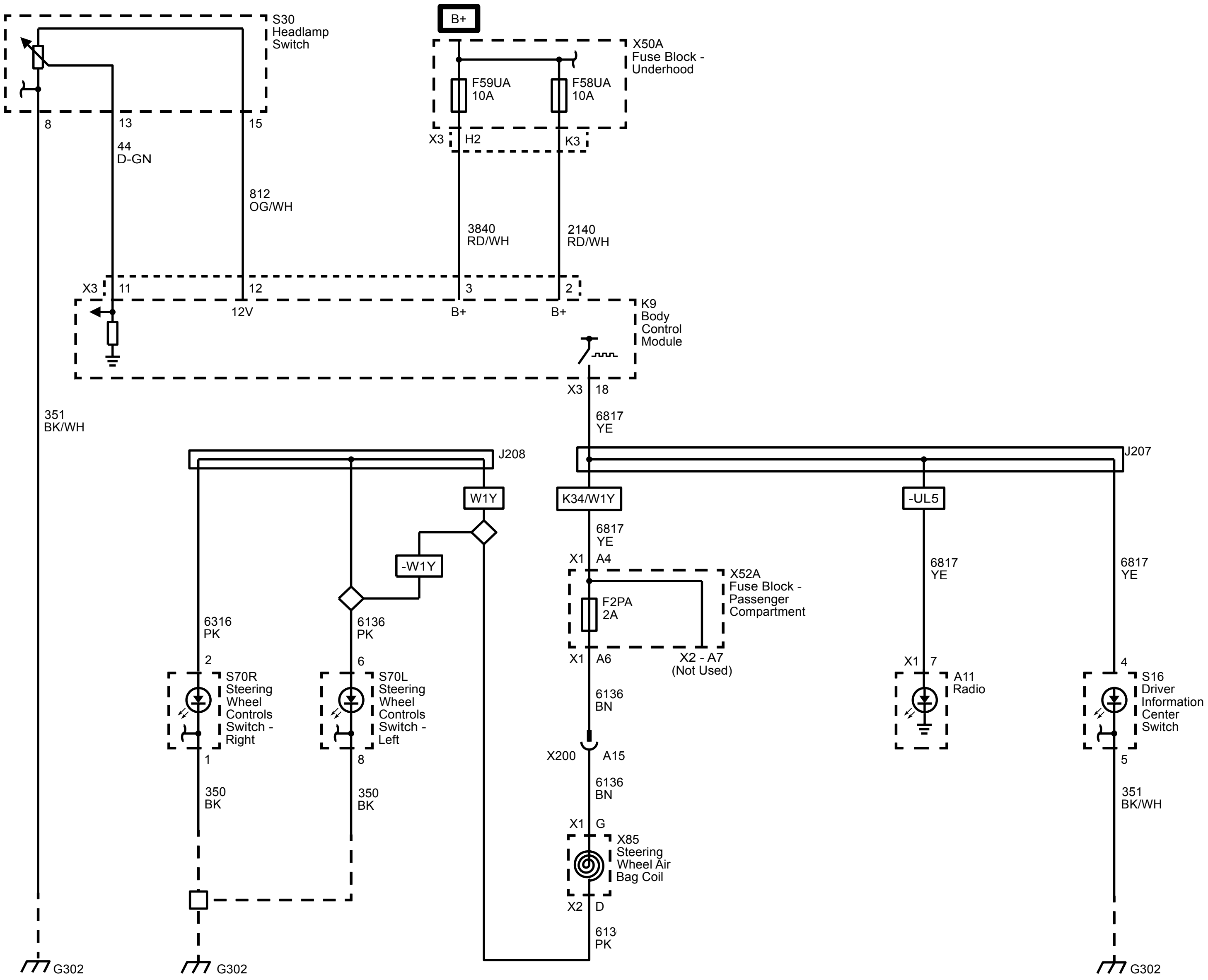

K9 Body Control Module
X2 5
YF7
-YF7
690 GY/BK
149 D-BU/WH
J280
B+
X1 K7
X1 H2
X52A Fuse Block - Passenger Compartment
CUTAWAY-YF7
(YF2/YF7)
KR78 Courtesy Lamps Provision Relay
F30PA 15A
X3 C7
X50A Fuse Block - Underhood
X2 A3
X1 E2
X2 H8
X2 H7
X405 K
PASSENGER
CARGO
J373
X205 H
-YF7
YF7
X420 8
X420 1
X417 A
X320 R
A
E37F Dome/Reading Lamps - Front
B
350 BK
E37M Dome/Reading Lamps - Middle
E37R Dome/Reading Lamps - Rear
E36AH Dome Lamp
1050 BK
850 BK
1850 BK
G302
G401
G401
G402
G348
LOC
DESC

Side Access Panel and Cargo Work Lamps (PRP with UF2)

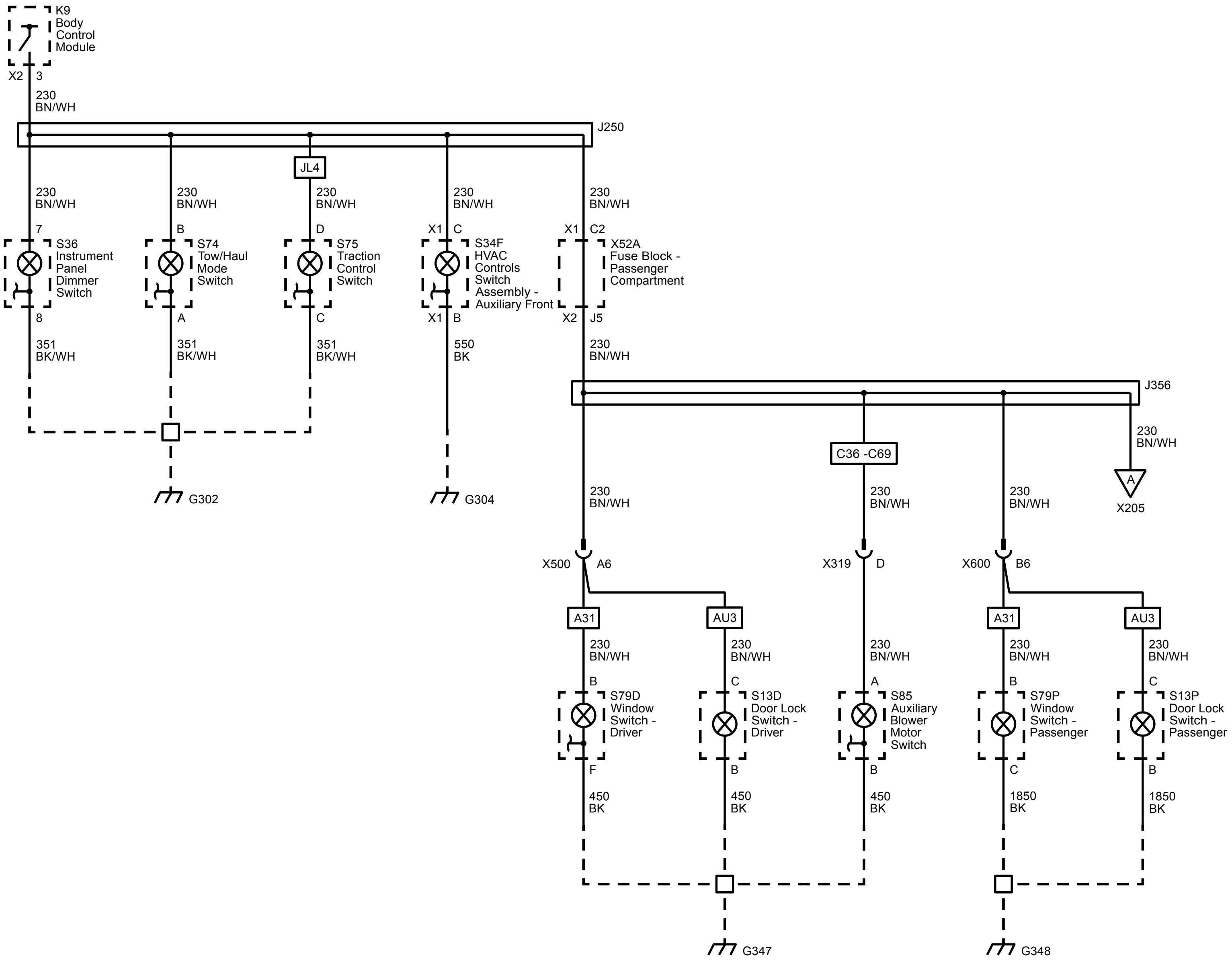

K9
Body Control
Module
X2
1
1732
OG
J302
1732
OG
X290
G
1732
RD
X53A
Fuse Block -
Rear Body
16
17
F1RA
10A
149
D-BU/WH
J350
149
D-BU/WH
149
D-BU/WH
149
D-BU/WH
149
D-BU/WH
149
D-BU/WH
A
E21LF
Fluorescent
Work Lamp -
Left Front
Access Panel
A
E21LR
Fluorescent
Work Lamp -
Left Rear
Access Panel
A
E21F
Fluorescent
Work Lamp -
Front Cargo
A
E21R
Fluorescent
Work Lamp -
Rear Cargo
A
E21A
Fluorescent
Work Lamp -
Right Access
Panel
B
150
BK
B
150
BK
B
150
BK
B
150
BK
B
150
BK
G403

Interior Lights Dimming Schematics

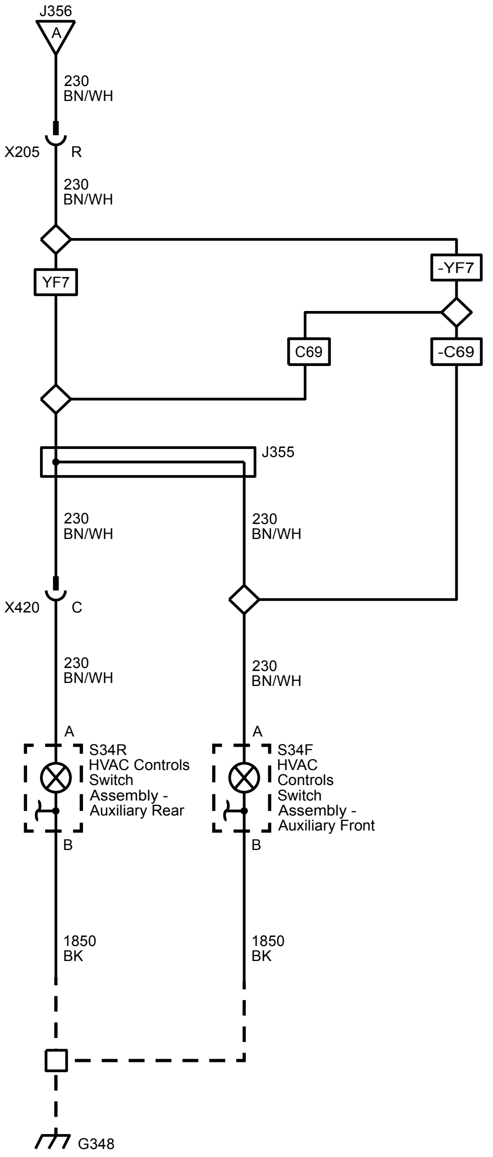
Dimming Controls and LED Dimming


S30
Headlamp
Switch
8
13
15
44
D-GN
812
OG/WH
351
BK/WH
B+
X50A
Fuse Block -
Underhood
F59UA
10A
F58UA
10A
X3
H2
K3
3840
RD/WH
2140
RD/WH
X3
11
12
3
2
12V
B+
B+
K9
Body
Control
Module
X3
18
6817
YE
J208
J207
W1Y
-W1Y
K34/W1Y
-UL5
6817
YE
X1
A4
X52A
Fuse Block -
Passenger
Compartment
F2PA
2A
X1
A6
X2 - A7
(Not Used)
6136
BN
X200
A15
6136
BN
X1
G
X85
Steering
Wheel Air
Bag Coil
X2
D
613
PK
6316
PK
6136
PK
2
6
S70R
Steering
Wheel
Controls
Switch -
Right
S70L
Steering
Wheel
Controls
Switch -
Left
1
8
350
BK
350
BK
6817
YE
X1
7
A11
Radio
6817
YE
4
S16
Driver
Information
Center
Switch
5
351
BK/WH
G302
G302
G302

I/P Bulb Dimming (1 of 2)


K9
Body
Control
Module
X2 3
230
BN/WH
J250
JL4
230
BN/WH
7
S36
Instrument
Panel
Dimmer
Switch
8
351
BK/WH
B
S74
Tow/Haul
Mode
Switch
A
351
BK/WH
D
S75
Traction
Control
Switch
C
351
BK/WH
X1 C
S34F
HVAC
Controls
Switch
Assembly -
Auxiliary Front
X1 B
550
BK
X1 C2
X52A
Fuse Block -
Passenger
Compartment
X2 J5
230
BN/WH
G302
G304
J356
C36 -C69
230
BN/WH
A
X205
X500 A6
X319 D
X600 B6
A31
AU3
A31
AU3
230
BN/WH
B
S79D
Window
Switch -
Driver
F
450
BK
C
S13D
Door Lock
Switch -
Driver
B
450
BK
A
S85
Auxiliary
Blower
Motor
Switch
B
450
BK
B
S79P
Window
Switch -
Passenger
C
1850
BK
C
S13P
Door Lock
Switch -
Passenger
B
1850
BK
G347
G348

I/P Bulb Dimming (2 of 2)


J356
A
230
BN/WH
X205
R
230
BN/WH
YF7
-YF7
C69
-C69
J355
230
BN/WH
230
BN/WH
X420
C
230
BN/WH
230
BN/WH
A
S34R
HVAC Controls
Switch
Assembly -
Auxiliary Rear
B
A
S34F
HVAC
Controls
Switch
Assembly -
Auxiliary Front
B
1850
BK
1850
BK
G348

Description and Operation

Exterior Lighting Systems Description and Operation

Exterior Lamps

The exterior lighting consist of the following lamps:

- Headlamps
- Daytime running lamps (DRL)
- Park lamps
- Tail lamps
- License lamps
- Marker lamps
- Turn signal lamps
- Stop lamps
- Center high mounted stop lamp (CHMSL)
- Backup lamps

Low Beam Headlamp Operation

The headlamps may be turned ON in 3 different ways:

- When the headlamp switch in the HEAD position for normal operations
- When the headlamp switch is in the AUTO position, for automatic lamp control (ALC)
- When the headlamp switch is placed in the AUTO position, with the windshield wipers ON in daylight conditions, after a 6 second delay

Battery voltage is applied at all times to the coil and switch sides of the LOW BEAM PCB Relay located in the underhood fuse block. With the headlamp switch in the headlamps ON position, ground is applied through the headlamps ON switch signal circuit to the body control module (BCM) signaling the headlamps ON request. In response to this signal, the BCM applies ground through the low beam relay control circuit energizing the LOW BEAM PCB Relay. With the relay energized, battery voltage is applied through the switch side of the relay, the LT and RT LOW BEAM fuses, and the low beam supply voltage circuits illuminating the low beam headlamps.

High Beam Headlamp Operation

Battery voltage is applied at all times to the coil and switch sides of the HIGH BEAM PCB Relay located in the underhood fuse block. When the headlamp dimmer switch is placed in the high beam position, the headlamp dimmer switch signal circuit to the BCM is pulled low signaling the headlamp high beam request. In response to this signal, the BCM applies ground through the high beam relay control circuit energizing the high beam relay. With the relay energized, battery voltage is applied through the switch side of the relay, the LT and RT HIGH BEAM fuses, and the high beam supply voltage circuits illuminating the high beam headlamps. At the same time the BCM sends a serial data message to the instrument panel cluster (IPC) requesting the IPC to illuminate the high beam indicator.

Flash to Pass (FTP)

When the headlamp dimmer switch is pulled toward the driver, the flash to pass signal circuit to the BCM is pulled low signaling the flash to pass request. The BCM then turns ON the high beam headlamps as described above until the headlamp dimmer switch is released. If the low beam headlamps were ON during FTP operation they will remain ON.

Daytime Running Lamps (DRL) and Automatic Lamp Control (ALC)

The low beam headlamps are used for DRL operation at a reduced intensity. The DRLs will operate only with the ignition ON, the headlamp switch in the AUTO position, and the gear selector out of the park position. No other exterior lamps such as the parking lamps, tail lamps, etc. will be on when the DRL are being used. The instrument panel will not be illuminated either.

DRL operation is determined by the ambient light sensor and controlled by the body control module (BCM). The ambient light sensor is a light-sensitive transistor used to monitor outside lighting conditions. The BCM provides a 5-volt reference signal to the sensor. The sensor will vary this voltage signal between 0.2 and 4.9 volts depending on outside lighting conditions. The BCM monitors the ambient light sensor signal circuit to determine if outside lighting conditions are correct for either DRL or ALC operation. When the BCM determines the conditions are met for DRL operation, it applies ground to the DRL relay control circuit energizing the DRL PCB Relay. With the relay energized, battery voltage is applied through the switch side of the relay, the DRL 1 fuse, the DRL 2 fuse, both low beam headlamp fuses, and the low beam supply voltage circuits illuminating the headlamps at a reduced intensity. Any function or condition that turns on the headlamps will cancel DRL operation.

When the BCM detects low light conditions, it will turn OFF the daytime running lamps and turn ON the low beam headlamps as described above in Low Beam Headlamp Operation. The BCM will also turn ON the low beam headlamps in daylight conditions when the windshield wipers are turned ON.

HDLPS Suggested Indicator

If the park lamps are turned ON manually and the ambient light sensor detects a low light condition then the body control module (BCM) will send a message to the instrument panel cluster (IPC) to display the HEADLAMPS SUGGESTED message.

Lights ON Warning

The body control module (BCM) activates the lights ON warning as requested by the headlamp dimmer switch. The lights ON warning sounds when the following occurs:

- The key is out of the ignition.
- The BCM determines that the drivers door is open, signal is low.
- The BCM determines that the headlamp switch is in the PARK or HEAD position.

Park, Tail, Marker and License Lamps

The park, tail, and marker lamps are turned ON when the headlamp switch is placed in either the HEAD or PARK lamp positions, or anytime the automatic light control (ALC) turns the headlamps ON. When the headlamp switch is placed in the park lamp or headlamp positions, ground is applied through the switch signal circuit to the BCM indicating the park lamp ON request. In response to this signal, the BCM applies ground through the park lamp relay control circuit energizing the PRK LAMP Relay. With the relay energized, battery voltage is applied through the switch side of the relay, the park lamp fuses, and the supply voltage circuits illuminating the park, license, side marker, and tail lamps.

Turn Signal Lamps

The BCM 3, BCM 5, and BCM 6 fuses located in the underhood fuse block supply battery voltage to the body control module (BCM) for turn signal, hazard lamp, and stop lamp operation. Voltage from the BCM 5 fuse used for the front and rear left turn signals, voltage from the BCM 3 for the right front turn signal, while voltage from the BCM 6 fuse is used for the right rear turn signal. When the turn signal switch is place in either the LEFT or RIGHT position, ground is applied through the turn signal switch signal circuit to the BCM indicating the turn signal request. In response to this signal, the BCM applies a pulsating voltage to the front and rear turn signal lamps supply voltage circuits cycling the lamps ON and OFF. The BCM also sends a message via to the instrument panel cluster (IPC) to cycle the turn signal indicator ON and OFF depending on the position of the turn signal switch.

Hazard Lamps

The hazard flashers may be activated in any power mode. When the hazard lamp switch is placed in the ON position, ground is applied through the hazard switch signal circuit to the body control module (BCM) indicating the hazard lamps ON request. In response to this signal, the BCM applies a pulsating voltage though all front and rear turn signal supply voltage circuits cycling the lamps ON and OFF. The BCM also sends a serial data message to the instrument panel cluster (IPC) to cycle both turn signal indicators ON and OFF.

Stop Lamps

The brake pedal position sensor is used to sense the action of the driver application of the brake pedal. The brake pedal position sensor provides an analog voltage signal that will increase as the brake pedal is applied. The body control module (BCM) provides a low reference signal and a 5-volt reference voltage to the brake pedal position sensor. When the variable signal reaches a voltage threshold indicating the brakes have been applied, the BCM will apply battery voltage to the right and left stop lamp control circuits, transmission control module (TCM), engine control module (ECM), center high mounted stop lamp (CHMSL) control circuit, and trailer brake control module if equipped.

Backup Lamps

When the gear selector is placed in the REVERSE position, the powertrain control module (PCM) sends a serial data message to the BCM indicating the backup lamps ON request. The BCM then applies battery voltage through the backup relay control circuit energizing the BCK/UP LAMP PCB Relay. With the relay energized, battery voltage is applied through the switch side of the relay, the T/LAMP BCK/UP fuse, the AUX/TRLR BCK/UP fuse and the supply voltage circuits illuminating the left and right backup lamps and the backup alarm. The engine may need to be running for the backup lamps to function.

Rear Fog Lamps

The rear fog lamps are located in the rear bumper. The fog lamps will operate only when the ignition in the RUN or CRANK positions. When the rear fog lamp switch is turned ON, ground is applied through the rear fog lamp switch signal circuit to the body control module (BCM) indicating the rear fog lamps ON request. In response to this signal, the BCM applies ground to the rear fog lamp relay control circuit energizing the REAR FOG LP PCB Relay. With the relay energized, battery voltage is applied through the switch side of the relay, the RR FOG LP fuse and the rear fog lamp supply voltage circuit to the left and right rear fog lamps. The BCM sends a serial data message to the instrument panel cluster (IPC) requesting the rear fog lamp indicator be illuminated. The rear fog lamps will deactivate if the headlamps are turned OFF, if the ignition is turned to the OFF position upon a key cycle, or if the driver turns the rear fog lamp switch OFF.

Battery Rundown Protection/Inadvertent Power

The BCM controls the lighting system through circuits that enable the exterior lamp functions of the park lamps, the head lamps, the fog lamps, and the interior lamps. The BCM will open these enabling circuits 10 minutes after the ignition switch is turned OFF with no lamp switch activity. If the ignition switch is turned to any position other than OFF, or if a lamp switch is activated during this time period, the timer will reset for another 10 minutes.

Interior Lighting Systems Description and Operation

The interior lighting consist of two groups; lamps that may not be manually dimmed (Interior Lamps) and lamps that may be dimmed (Interior Lamps Dimming).

The first group listed below includes lamps that may not be dimmed:

- Front dome/reading lamps
- Middle dome/reading lamps
- Rear dome/reading lamps
- Sunshade Mirror Lamps
- Underhood Lamp

Interior Lamps Features

The interior lamps system features the following functions:

- An illuminated entry feature that illuminates the courtesy lamps when entering the vehicle or activating the remote keyless entry system.
- An illuminated exit feature that illuminates the courtesy lamps when the ignition key has been removed from the ignition.
- An inadvertent power feature that supplies voltage to all interior lamps after the ignition is turned OFF. The inadvertent power feature will deactivate all interior lamps after 10 minutes to prevent battery rundown.
- A theater dimming feature that will slowly dim the interior lamps from full brightness to OFF.
- Individual switches for control of each interior lamp that is not illuminate with the interior lamp switch.

Courtesy Lamps (−YF2/YF7)

When any one of the doors is opened, ground is applied through the door latch door open switch and the door open switch signal circuit to the BCM indicting the door open position. In response to this signal, the BCM then applies battery voltage through the courtesy lamp supply voltage circuits illuminating the courtesy lamps.

Courtesy Lamps (+YF2/YF7)

When any one of the doors is opened, ground is applied through the door latch door open switch and the door open switch signal circuit to the BCM indicting the door open position. In response to this signal, the BCM then applies battery voltage to the courtesy lamp relay control circuit energizing the UPFITTR CTSY LAMPS PCB Relay. With the relay energized. battery voltage is applied through the switch side of the relay and the supply voltage circuits illuminating the courtesy lamps.

Courtesy Lamps Manual Operation

The courtesy lamps can be manually turned ON by the IP dimmer switch. When the dimmer switch is placed in the DOME position, ground is applied through the dimmer switch and the courtesy lamp switch ON signal circuit to the BCM indicating the courtesy lamps ON request. In response to this signal, the BCM then applies battery positive voltage through the courtesy lamp supply voltage circuits illuminating the courtesy lamps listed above. The courtesy lamps ON operation of the dimmer switch will override any BCM operation of the interior lamps already in progress.

Keyless Entry Interior Illumination

When the remote function actuator transmitter is used to unlock the doors, the BCM receives a door-unlock signal. The BCM must have inputs that indicate that the ignition switch is OFF, the courtesy lamp switch is OFF, and all the doors are closed. The BCM will then illuminate the courtesy lamps and will remain illuminated for approximately 25 seconds after the door is closed. If the door locks are activated to the LOCK position, or if the ignition switch is turned to either the RUN or START position, the BCM will turn OFF the courtesy lamps immediately.

Courtesy/Illuminated Exit

The illuminated exit feature will activate the courtesy lamps when the key IN input of the BCM transitions from an active state to an inactive state (removing the ignition key). When the key is removed from the ignition, the key IN input to the BCM becomes inactive. The BCM will illuminate the courtesy lamps for approximately 25 seconds.

Theater Dimming

The theater dimming feature that will slowly dim the interior lamps from full brightness to OFF. The following actions will over ride the theater dimming feature causing the courtesy lamps to deactivate immediately if no other BCM function commands the courtesy lamps ON:

- A transition from active to inactive of the interior lamps switch, turning OFF the interior lamps switch
- A LOCK command from the remote keyless entry system
- A last door closed locking function, locking and closing all the doors

Underhood Compartment Lamp

The BCM supplies battery positive voltage through the inadvertent power courtesy lamps circuit to the underhood compartment lamp. When the hood is opened, the underhood compartment lamp switch closes to ground and the lamp illuminates.

Dome/Reading Lamps

The dome/reading lamp is a duel purpose lamp that can be illuminated two different ways. First, the lamp can be turned ON during courtesy lamp operation as described above. Second, the lamps can be turned ON individually for reading lamp operation by the lamp switch. The BCM supplies battery voltage through the inadvertent power courtesy lamp circuit to the dome/reading lamp for reading lamp operation only.

Sunshade Vanity Mirror Lamps

The BCM supplies battery voltage through the inadvertent power courtesy lamps circuit to the left and right vanity mirror lamps. When the vanity mirror cover on the sunshade is opened, the vanity mirror lamp switch is closed to ground and the lamp illuminates.

Interior Lamps Dimming

The second interior lighting group includes lamps which may be dimmed. This group may use a combination of vacuum fluorescent (VF) illumination, LED illumination and incandescent lamps.

- Headlamp switch
- Tow/haul switch
- Traction control switch
- HVAC control module
- Driver window switch
- Driver power door lock switch
- Auxiliary blower motor switch
- Front passenger window switch
- Front passenger door lock switch
- Front auxiliary HVAC control assembly
- Rear auxiliary HVAC control assembly
- Steering wheel controls
- Inflatable restraint I/P module disable switch
- Driver information center (DIC) display switch
- Radio

When the ignition switch is turned to the RUN position, the instrument panel cluster (IPC), radio VF display, and the HVAC control assembly turns ON at maximum brightness. When the headlamp switch is in the PARK or HEADLAMP ON position, all incandescent and LED back lighting turn ON at the dimming level indicated by the instrument panel (I/P) dimmer switch. The dimmer switch is used to increase and decrease the brightness of the interior backlighting components. The BCM supplies a voltage reference through the I/P dimming voltage reference circuit to the interior lamp dimmer switch, which is part of the headlamp switch. When the dimmer switch is placed in a desired brightness position, reference voltage is applied through the dimmer switch rheostat and the I/P lamps dimmer switch signal circuit to the BCM. The BCM interprets this voltage signal, then applies a pulse width modulated (PWM) voltage through the I/P lamps supply voltage circuits and the LED dimming supply circuit to all related interior backlighting lamps illuminating them to the desired level of brightness.

Battery Rundown Protection / Inadvertent Power

The BCM controls the lighting system through circuits that enable the exterior lamp functions of the park lamps, the head lamps, the fog lamps, and the interior lamps. The BCM opens these enabling circuits 10 minutes after the ignition switch is turned OFF with no lamp switch activity. If the ignition switch is turned to any position other than OFF, or if a lamp switch is activated during this time period, the timer resets for another 10 minutes.

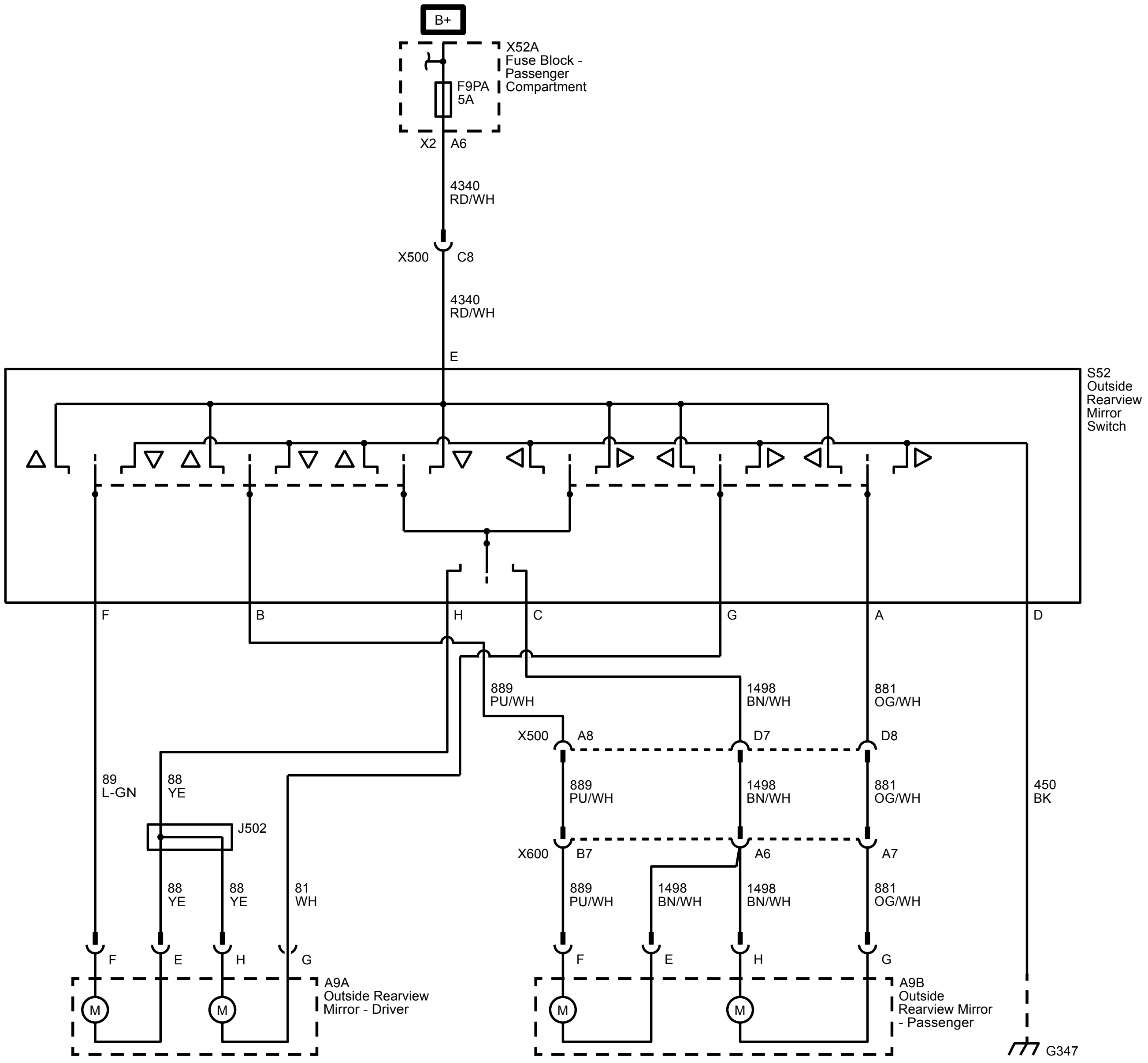
Body Systems

Mirrors

Schematic and Routing Diagrams

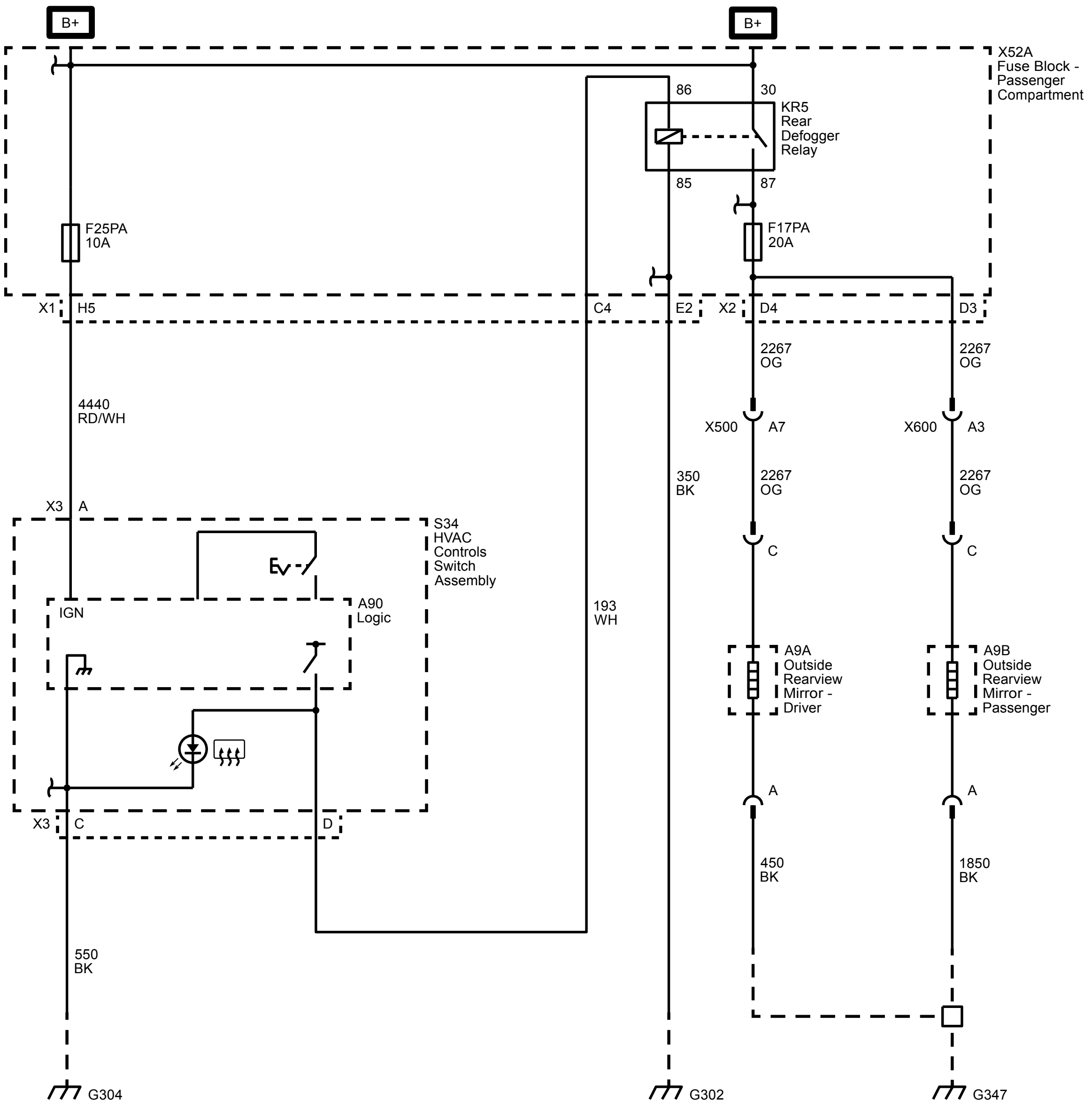
Outside Rearview Mirror Schematics

Pan and Tilt (DEB or DE5)



B+
X52A Fuse Block - Passenger Compartment
F9PA 5A
X2 A6
4340 RD/WH
X500 C8
4340 RD/WH
E
S52 Outside Rearview Mirror Switch
F
B
H
C
G
A
D
889 PU/WH
1498 BN/WH
881 OG/WH
X500 A8
D7
D8
89 L-GN
88 YE
J502
889 PU/WH
1498 BN/WH
881 OG/WH
450 BK
X600 B7
A6
A7
88 YE
88 YE
81 WH
889 PU/WH
1498 BN/WH
1498 BN/WH
881 OG/WH
F
E
H
G
M
M
A9A Outside Rearview Mirror - Driver
F
E
H
G
M
M
A9B Outside Rearview Mirror - Passenger
G347

Heated Mirrors (DEB or DE5)


B+
B+
X52A
Fuse Block - Passenger Compartment
86
30
KR5 Rear Defogger Relay
85
87
F25PA 10A
F17PA 20A
X1
H5
C4
E2
X2
D4
D3
2267 OG
2267 OG
4440 RD/WH
X500
A7
X600
A3
350 BK
2267 OG
2267 OG
X3
A
S34 HVAC Controls Switch Assembly
C
C
IGN
A90 Logic
193 WH
A9A Outside Rearview Mirror - Driver
A9B Outside Rearview Mirror - Passenger
A
A
X3
C
D
450 BK
1850 BK
550 BK
G304
G302
G347

Description and Operation

Outside Mirror Description and Operation

Outside Mirror System Components

The power mirror system consists of the following components:

- Power mirror switch
- Selector switch
- Left outside power mirror
- Right outside power mirror
- OSRVM 10A fuse
- HVAC control module
- Left outside power mirror
- Right outside power mirror

Each of the outside power mirrors contains two reversible motors. The vertical motor operates the up and down directions and the horizontal motor operates the left and right directions. Each of the power mirror motors are circuit breaker protected.

Power Mirror System Controls

The power mirror switch incorporates a mirror select switch and a four position mirror direction switch.

The mirror select switch allows the operator to select the mirror to be moved by rotating counterclockwise to the L position, left outside power mirror, or rotating clockwise to the R position, right outside power mirror.

The mirror direction switch is a 4 position switch that allows the operator to move the selected mirror up, down, left or right.

Power Mirror System Operation

The power mirror switch receives power through the battery supply voltage circuit and the OSRVM fuse. The power mirror switch also receives a constant ground.

The four positions of the direction switch have dual switch contacts. Each of the contacts are connected to opposing sides of the appropriate power mirror motors through the selector switch. The selector switch interrupts or completes these circuits depending on the position of the selector switch (L or R).

If the selector switch is placed in the L position and the up switch is depressed, battery voltage will be supplied to the left outside power mirror vertical motor through the left mirror motor up direction circuit and return to the power mirror switch through the mirror motor common circuit then to ground and the mirror will move up. If the down switch is depressed, the common circuit supplies battery voltage and the left mirror motor up direction circuit completes the path to the power mirror switch then to ground and the mirror will move down.

The remainder of the mirror functions operate in the same manner as described above. The thing to remember is, that by placing the power mirror switch in opposing positions (left/right or up/down) will reverse the polarity of the mirror motor, utilizing the same circuits and the power mirror will move accordingly.

Heated Mirror System Controls

The heated mirror system is activated by depressing the rear window defogger switch, which is part of the HVAC control module. For further information on the rear window defogger operation, refer to Rear Window Defogger Description and Operation.

Heated Mirror System Operation

The heated mirror system operates in parallel to the rear window defogger. Each outside rearview mirror contains a heating element that is connected to a constant ground source. When the rear window defogger system is active, battery voltage is available to the outside rearview mirrors through the heated mirror supply voltage circuit. The mirrors will heat up to remove ice, snow or frost and will automatically deactivate when the rear defogger system has timed out, approximately 10 minutes.

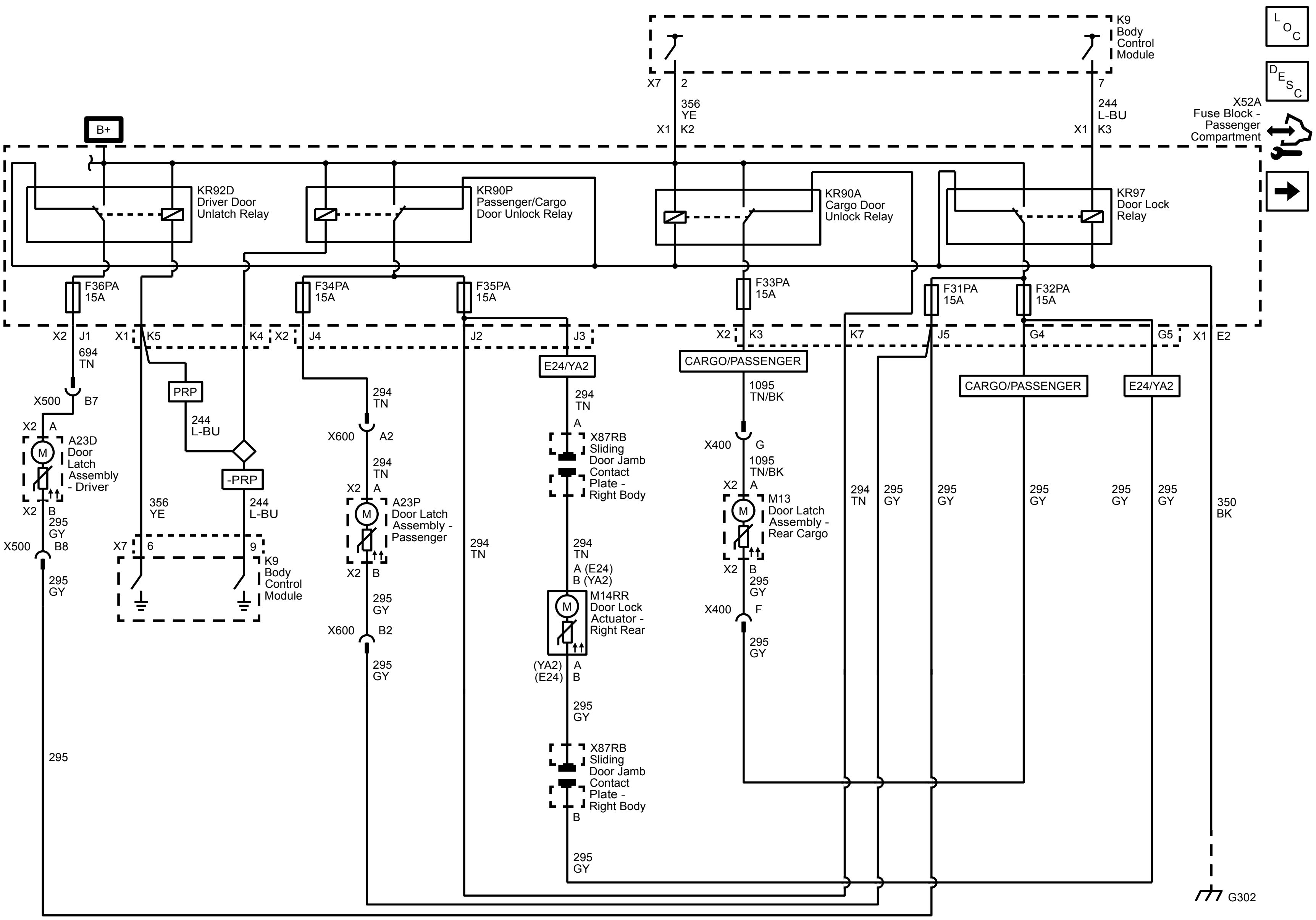
Body Systems

Vehicle Access

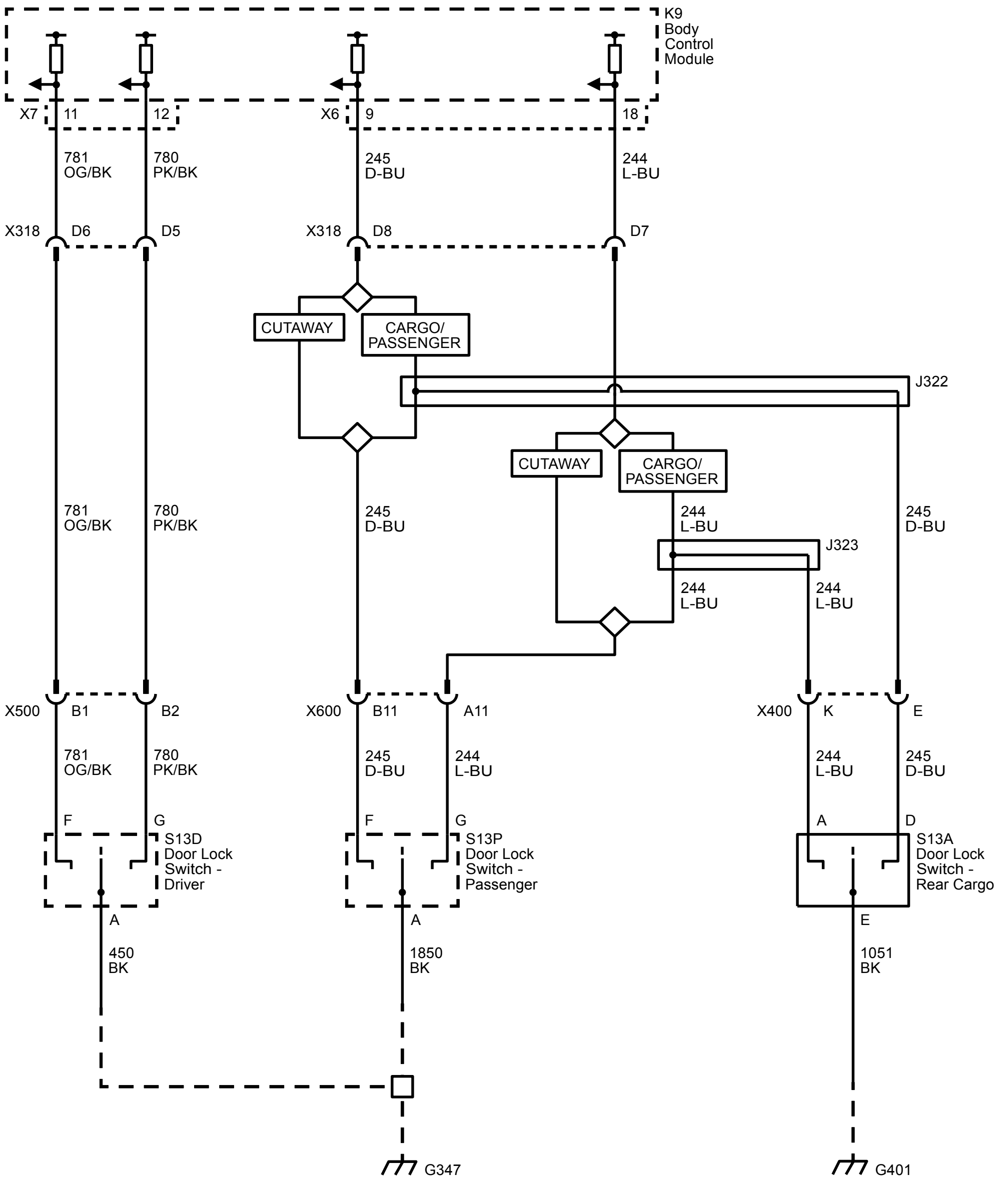
Schematic and Routing Diagrams

Door Lock/Indicator Schematics

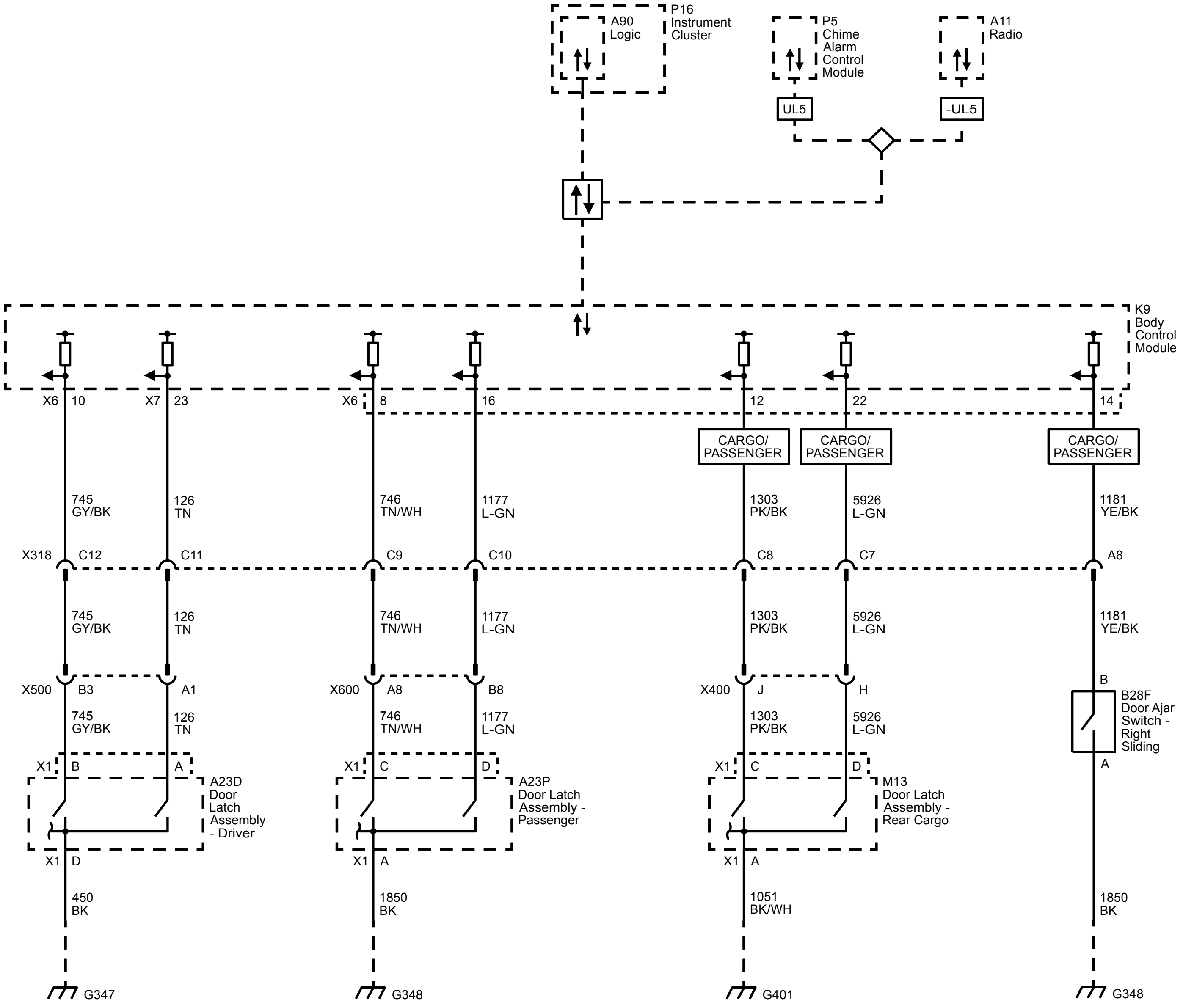
Lock/Unlock Control


K9 Body Control Module
X7
2
356 YE
X1
K2
7
244 L-BU
K3
X52A Fuse Block - Passenger Compartment
B+
KR92D Driver Door Unlatch Relay
KR90P Passenger/Cargo Door Unlock Relay
KR90A Cargo Door Unlock Relay
KR97 Door Lock Relay
F36PA 15A
F34PA 15A
F35PA 15A
F33PA 15A
F31PA 15A
F32PA 15A
X2
J1
K5
K4
J4
J2
J3
K7
J5
G4
G5
E2
694 TN
X500
B7
A
A23D Door Latch Assembly - Driver
B
295 GY
B8
295
PRP
244 L-BU
-PRP
356 YE
6
9
294 TN
X600
A2
A23P Door Latch Assembly - Passenger
B2
E24/YA2
X87RB Sliding Door Jamb Contact Plate - Right Body
A (E24)
B (YA2)
M14RR Door Lock Actuator - Right Rear
(YA2)
(E24)
CARGO/PASSENGER
1095 TN/BK
X400
G
M13 Door Latch Assembly - Rear Cargo
F
350 BK
G302
M
LOC
DESC

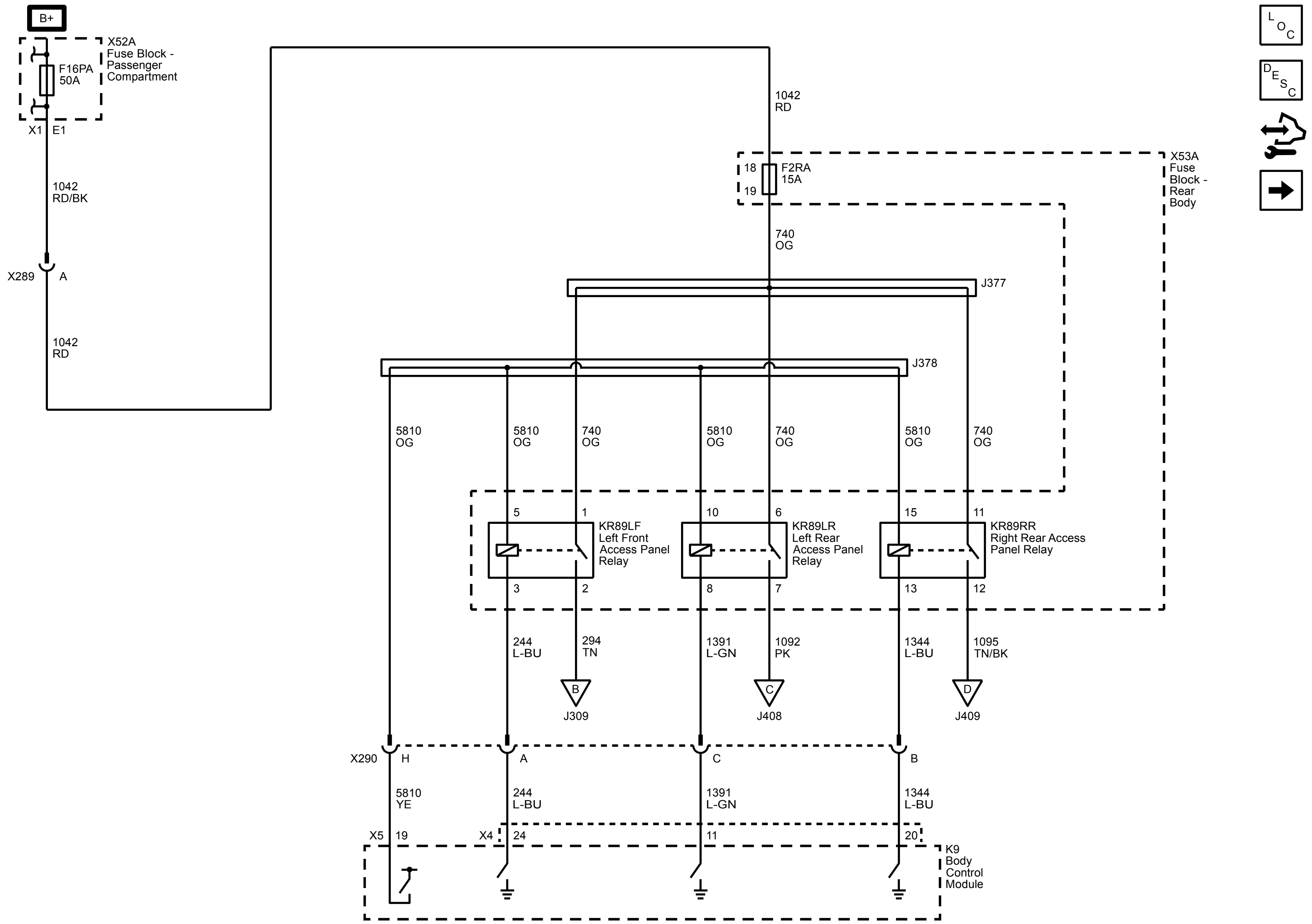
Door Lock Switches (AU3)


K9
Body
Control
Module
X7
11
12
X6
9
18
781
OG/BK
780
PK/BK
245
D-BU
244
L-BU
X318
D6
D5
X318
D8
D7
CUTAWAY
CARGO/
PASSENGER
J322
CUTAWAY
CARGO/
PASSENGER
781
OG/BK
780
PK/BK
245
D-BU
244
L-BU
J323
244
L-BU
244
L-BU
245
D-BU
X500
B1
B2
X600
B11
A11
X400
K
E
781
OG/BK
780
PK/BK
245
D-BU
244
L-BU
244
L-BU
245
D-BU
F
G
S13D
Door Lock
Switch -
Driver
F
G
S13P
Door Lock
Switch -
Passenger
A
D
S13A
Door Lock
Switch -
Rear Cargo
A
450
BK
A
1850
BK
E
1051
BK
G347
G401

Door Ajar Switches


A90 Logic
P16 Instrument Cluster
P5 Chime Alarm Control Module
A11 Radio
UL5
-UL5
K9 Body Control Module
X6
10
X7
23
X6
8
16
12
22
14
CARGO/ PASSENGER
CARGO/ PASSENGER
CARGO/ PASSENGER
745 GY/BK
126 TN
746 TN/WH
1177 L-GN
1303 PK/BK
5926 L-GN
1181 YE/BK
X318
C12
C11
C9
C10
C8
C7
A8
745 GY/BK
126 TN
746 TN/WH
1177 L-GN
1303 PK/BK
5926 L-GN
1181 YE/BK
X500
B3
A1
X600
A8
B8
X400
J
H
B
B28F Door Ajar Switch - Right Sliding
A
745 GY/BK
126 TN
746 TN/WH
1177 L-GN
1303 PK/BK
5926 L-GN
X1
B
A
A23D Door Latch Assembly - Driver
X1
C
D
A23P Door Latch Assembly - Passenger
X1
C
D
M13 Door Latch Assembly - Rear Cargo
X1
D
X1
A
X1
A
450 BK
1850 BK
1051 BK/WH
1850 BK
G347
G348
G401
G348

Side Access Panel Relay Controls (PRP)


B+
X52A
Fuse Block -
Passenger
Compartment
F16PA
50A
X1
E1
1042
RD/BK
X289
A
1042
RD
1042
RD
18
F2RA
15A
19
X53A
Fuse
Block -
Rear
Body
740
OG
J377
J378
5810
OG
5810
OG
740
OG
5810
OG
740
OG
5810
OG
740
OG
5
1
KR89LF
Left Front
Access Panel
Relay
10
6
KR89LR
Left Rear
Access Panel
Relay
15
11
KR89RR
Right Rear Access
Panel Relay
3
2
8
7
13
12
244
L-BU
294
TN
1391
L-GN
1092
PK
1344
L-BU
1095
TN/BK
B
J309
C
J408
D
J409
X290
H
A
C
B
5810
YE
244
L-BU
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1344
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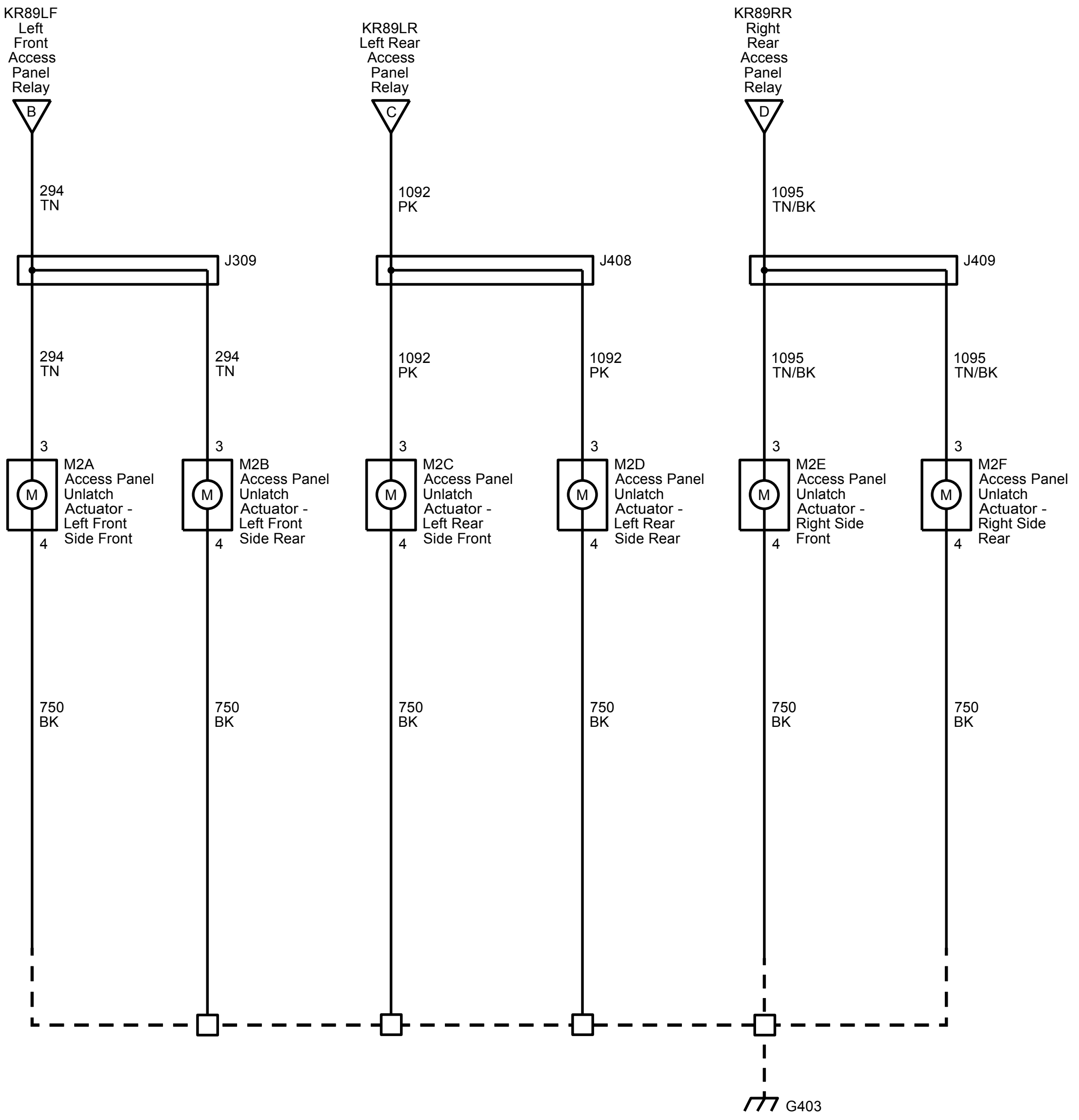
20
K9
Body
Control
Module
LOC
DESC


KR89LF Left Front Access Panel Relay
B
KR89LR Left Rear Access Panel Relay
C
KR89RR Right Rear Access Panel Relay
D
294 TN
1092 PK
1095 TN/BK
J309
J408
J409
294 TN
294 TN
1092 PK
1092 PK
1095 TN/BK
1095 TN/BK
3
M2A Access Panel Unlatch Actuator - Left Front Side Front
4
3
M2B Access Panel Unlatch Actuator - Left Front Side Rear
4
3
M2C Access Panel Unlatch Actuator - Left Rear Side Front
4
3
M2D Access Panel Unlatch Actuator - Left Rear Side Rear
4
3
M2E Access Panel Unlatch Actuator - Right Side Front
4
3
M2F Access Panel Unlatch Actuator - Right Side Rear
4
M
750 BK
750 BK
750 BK
750 BK
750 BK
750 BK
G403

Description and Operation

Access Panel Description and Operation

The access panel entry system is a supplementary vehicle entry device. Radio frequencies or discharged batteries may disable the system.

The access panel entry system allows you to operate the following components:

- The Left Front Access Panel if equipped
- The Left Rear Access Panel
- The Right Rear Access Panel

Pro/Access models use the key fob to activate up to 3 access panels depending on the cargo door option:

- One access panel on the right side of the vehicle.
- One access panel on the left side of vehicles equipped with left side cargo doors.
- Two access panels on the left side of vehicles not equipped with left side cargo doors.

The access panel entry system has the following main components:

- The transmitters
- The remote control door lock receiver (RCDLR).
- The body control module (BCM).

This vehicle is not equipped with remote keyless entry system (RKE). The transmitter is used exclusively to operate the access panels. When you press any button on a programmed k transmitter, the transmitter sends a signal to the RCDLR. The RCDLR sends a class 2 message to the body control module (BCM) which activates the appropriate access panel relay, releasing the panel.

Rolling Code

The access panel entry system uses rolling code technology. Rolling code technology prevents anyone from recording the message sent from the transmitter and using the message in order to gain entry to the vehicle. The term, rolling code, refers to the way that the keyless entry system sends and receives the signals. The transmitter sends the signal in a different order each time. The transmitter and the RCDLR are synchronized to the appropriate order. If a programmed transmitter sends a signal that is not in the order that the RCDLR expects, then the transmitter is out of synchronization. This occurs after 256 presses of any transmitter button when it is out of range of the vehicle.

Door Ajar Indicator Description and Operation

Door Ajar Indicator System Components

The door ajar indicator system consists of the following components:

- The body control module (BCM)
- The instrument panel cluster (IPC)
- The driver information center (DIC)
- The door ajar switch

Door Ajar Operation

The body control module (BCM) receives a discrete input from the door ajar switch to indicate the status of the door. The BCM then communicates this status to the instrument panel cluster (IPC) via GMLAN serial data. The IPC, upon receipt of this message, will illuminate the door ajar message in the driver information center (DIC) and also send a GMLAN serial data message to the radio to activate the door ajar audible warning when the following conditions are met:

- The transmission is shifted out of PARK.
- The vehicle speed is greater than 8 km/h (5 mph).

Power Door Locks Description and Operation

Door Lock System Components

The power door lock system consists of the following components:

- Driver door lock switch
- Front passenger door lock switch
- Rear cargo door lock switch
- Door lock relay
- Passenger door unlock relay
- Driver door unlock relay
- Cargo door unlock relay
- Body Control Module (BCM)
- Reversible door lock actuators in each of the doors
- DRV LKS 10A fuse, driver door unlock relay supply voltage
- CARGO UNLK 10A fuse, cargo door unlock relay supply voltage
- DOOR LKS 20A fuse, door lock relay and passenger door unlock relay supply voltage

Door Lock System Controls

The power door lock system can be controlled by any of the following:

- A power door lock or unlock switch activation
- A keyless entry transmission
- A lock out prevention function
- A last door locking function

Driver, Passenger and Cargo Door Lock Operation

When any of the door lock switches are placed in the lock position, a ground signal is applied to the BCM through the door lock signal circuit. Upon receiveing this signal, the BCM grounds the control side of the door lock relay through the door lock relay control circuit. Since the other side of the door lock relay winding is connected to battery voltage, the relay is energized. This causes the contacts to close and complete the path from the DOOR LKS fuse through the battery voltage circuit. Voltage is then applied to the lock side of the door lock actuators through the door lock actuator lock circuits. Since the other side of the all the door lock actuators are connected to the normally closed contacts of their respective unlock relays to ground, the doors lock.

The lock function can also be accomplished by the BCM supplying ground to the door lock relay control circuit by either of the following:

- A keyless entry lock transmission
- A last door lock function

Driver Door Unlock Operation

When any of the door lock switches are placed in the unlock position, a ground signal is applied to the BCM through the door unlock signal circuit. Upon receiveing this signal, the BCM grounds the control side of the driver door unlock relay through the driver door unlock relay control circuit. Since the other side of the driver door unlock relay winding is connected to battery voltage, the relay is energized. This causes the contacts to close and complete the path from the DRV LKS fuse through the battery voltage circuit. Voltage is then applied to the unlock side of the driver door lock actuator through the driver door lock actuator unlock control circuit. Since the other side of the the driver door lock actuator is connected to the normally closed contacts of the door lock relay to ground, the driver door unlocks.

The driver door unlock function can also be accomplished by the BCM supplying ground to the driver door unlock relay control circuit by either of the following:

- A keyless entry unlock transmission
- A lock out prevention function

Passenger Door Unlock Operation

When any of the door lock switches are placed in the unlock position, a ground signal is applied to the BCM through the door unlock signal circuit. Upon receiveing this signal, the BCM grounds the control side of the passenger door unlock relay through the door unlock relay control circuit. Since the other side of the door unlock relay winding is connected to battery voltage, the relay is energized. This causes the contacts to close and complete the path from the DOOR LKS fuse through the battery voltage circuit. Voltage is then applied to the unlock side of the passenger door lock actuators through the door lock actuator unlock control circuits. Since the other side of the the door lock actuators are connected to the normally closed contacts of the door lock relay to ground, the passenger doors unlock.

The door unlock function can also be accomplished by the BCM supplying ground to the passenger door unlock relay control circuit during a keyless entry unlock transmission.

Cargo Door Unlock Operation

When any of the door lock switches are placed in the unlock position, a ground signal is applied to the BCM through the door unlock signal circuit. Upon receiveing this signal, the BCM grounds the control side of the cargo door unlock relay through the cargo door unlock relay control circuit. Since the other side of the cargo door unlock relay winding is connected to battery voltage, the relay is energized. This causes the contacts to close and complete the path from the CARGO UNLK fuse through the battery voltage circuit. Voltage is then applied to the unlock side of the cargo door lock actuator through the door lock actuator unlock control circuit. Since the other side of the the cargo door lock actuator is connected to the normally closed contacts of the door lock relay to ground, the cargo door unlocks.

The cargo door unlock function can also be accomplished by the BCM supplying ground to the cargo door unlock relay control circuit during a keyless entry unlock transmission.

Delay Locking Operation

This feature allows the operator to lock all the doors from a door lock switch with the side doors(s) open. The side cargo doors have contact plates that complete the power door lock and unlock control circuits, among others, when the side cargo doors are closed, and interrupt these circuits when the doors are open. When a lock function occurs and the BCM senses an active state on any door ajar switch signal circuit the driver, front passenger and cargo doors will lock as described. The BCM continues to monitor door ajar switch signal circuits. When the BCM senses an inactive state, door closed, the BCM will cycle the door lock relay again after approximately 5 seconds to perform another lock function, thus locking the side cargo door(s).

Lockout Prevention

This feature prevents the locking of the driver door if the ignition key is left in the ignition lock cylinder. If a lock function occurs from any door lock switch and the BCM senses a door ajar and the key in ignition switch signal circuit is in the yes state, the BCM will cycle the door lock relay to lock the doors and then cycle the driver door unlock relay to unlock the driver door.

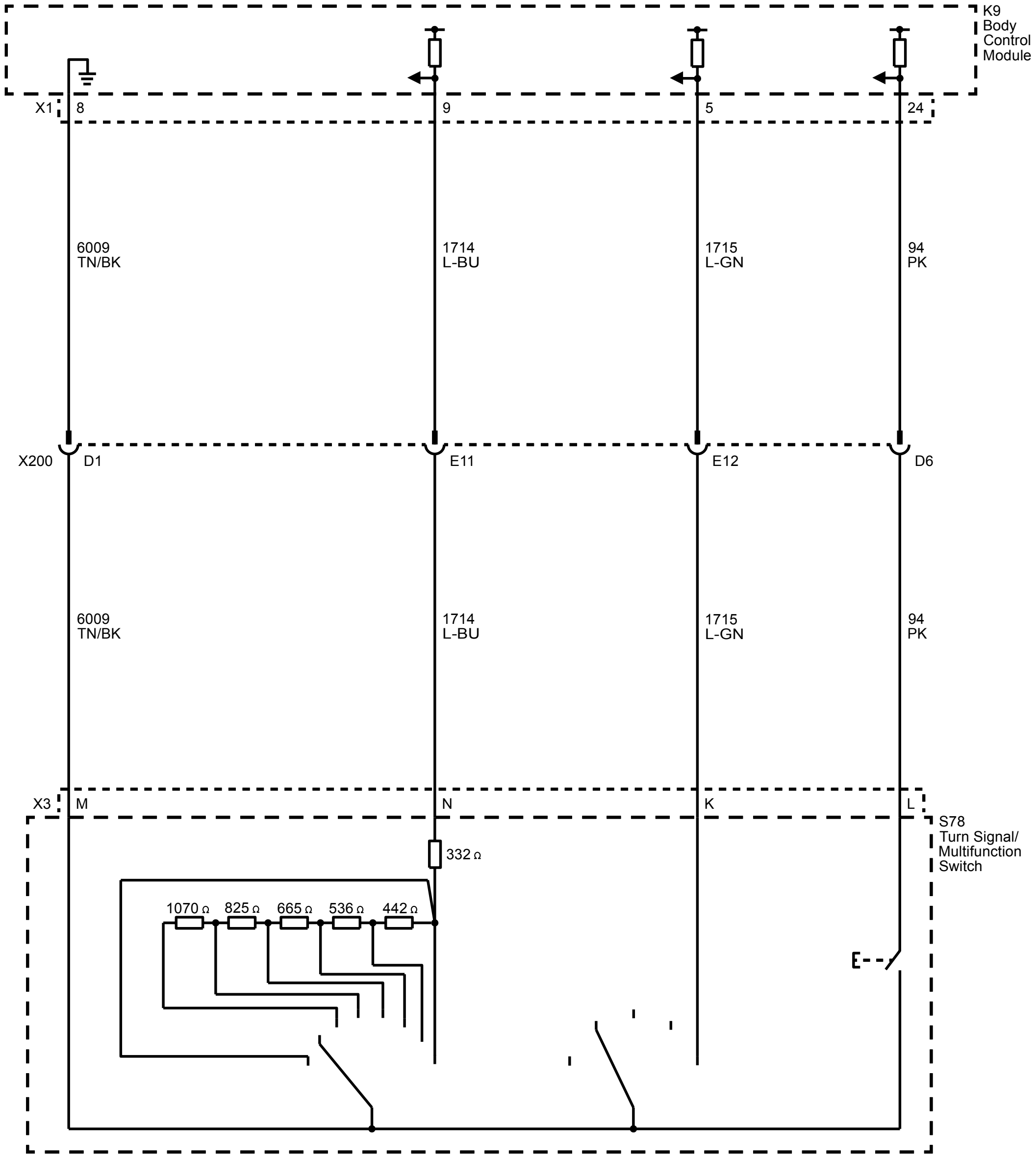
Body Systems

Wipers and Washers

Schematic and Routing Diagrams

Wiper/Washer Schematics

Wiper Controls


K9
Body
Control
Module
X1
8
9
5
24
6009
TN/BK
1714
L-BU
1715
L-GN
94
PK
X200
D1
E11
E12
D6
6009
TN/BK
1714
L-BU
1715
L-GN
94
PK
X3
M
N
K
L
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Multifunction
Switch
332 Ω
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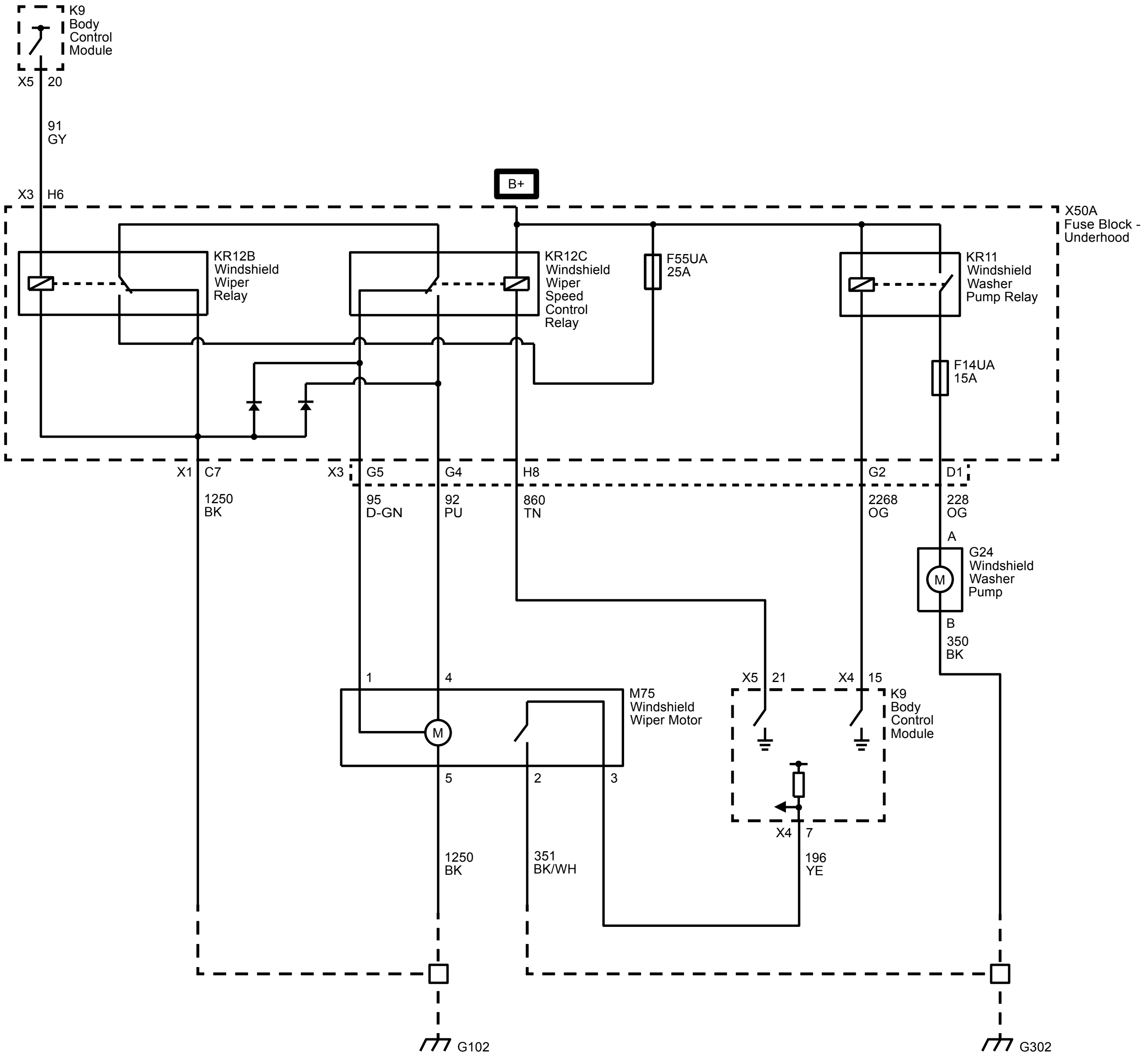
665 Ω
536 Ω
442 Ω

Wiper and Washer Motor Control


K9
Body
Control
Module
X5 20
91
GY
B+
X3 H6
X50A
Fuse Block -
Underhood
KR12B
Windshield
Wiper
Relay
KR12C
Windshield
Wiper
Speed
Control
Relay
F55UA
25A
KR11
Windshield
Washer
Pump Relay
F14UA
15A
X1 C7
X3 G5
G4
H8
G2
D1
1250
BK
95
D-GN
92
PU
860
TN
2268
OG
228
OG
A
G24
Windshield
Washer
Pump
M
B
350
BK
1
4
M75
Windshield
Wiper Motor
M
5
2
3
X5 21
X4 15
K9
Body
Control
Module
X4 7
1250
BK
351
BK/WH
196
YE
G102
G302

Description and Operation

Wiper/Washer System Description and Operation (Wiper and Washers)

Wiper/Washer System Components

The Wiper/Washer System consists of the following components:

- Windshield wiper/washer switch
- Body control module (BCM)
- WPR Relay
- WPR HI Relay
- Windshield wiper motor
- Windshield washer fluid pump
- Windshield washer fluid level switch
- Rain sensor module
- Instrument panel cluster (IPC)
- WPR Fuse 25 A
- WSW/PUMP Fuse 10 A
- RAP Fuse 10 A

Refer to Master Electrical Component List.

Power and Grounds

With the ignition in the ON position, accessory voltage is supplied through the 25A WPR fuse to the WIPER relay, the WIPER HI relay and the WSH relay that are all located in the underhood fuse block. Refer to Wiper/Washer Schematics.

G101 provides ground for the windshield wiper motor. G104 provides ground for the WPR relay, the WPR HI relay, the windshield washer fluid pump and the windshield washer fluid level switch.

Modes of Operation

The normal wiper system function positions are as follows:

- MIST
- DELAY
- MANUAL LOW
- MANUAL HIGH
- WASH

Automatic Modes of Operation

- AUTOMATIC DELAY
- AUTOMATIC LOW
- AUTOMATIC HIGH

Automatic low speed and automatic high speed wiper modes are continuous wiper operations that are controlled by the outside moisture sensor. Automatic low and high speed operation is utilized when the amount of precipitation on the windshield exceeds the automatic delay or low threshold.

Moisture Sensitive Wipers

The outside moisture sensor monitors moisture accumulation on the windshield and uses a windshield wiper/washer switch status input to provide wipe commands to the body control module (BCM). The DELAY positions on the wiper/washer switch are used to activate the AUTOMATIC rain sensing operating mode. They are also used to adjust the level of sensitivity to moisture accumulation, which determines the dwell time for commanding a wiper motor wipe cycle.

Accessory voltage is supplied to the outside moisture sensor through the 10A RAP Fuse, located in the rear fuse block. The sensor is grounded through the ground circuit and G402. Whenever the ignition is in the run or accessory positions, the BCM sends the wiper/washer switch status using a pulse width modulation (PWM) signal through the outside moisture sensor signal 1 circuit to the outside moisture sensor. When a wipe cycle is needed, the moisture sensor sends a PWM voltage signal through the moisture sensor signal 2 circuit back to the BCM requesting the wiper operation.

The outside moisture sensor uses the moisture sensor signal 2 circuit to command wiper motor wipe cycles and to confirm the moisture sensor signal 1 is being received. If at anytime communication between the outside moisture sensor and BCM is lost, the BCM will use the inputs from the windshield wiper/washer switch in the delay positions to operate the wiper motor at continuous variable delay intervals.

Low Speed Operation

When the wiper switch is in the low speed position, ground is applied through a resistor internal to the switch and the wiper switch low signal circuit to the body control module (BCM). In response to this signal, the BCM energizes the WPR relay by applying battery voltage through the wiper relay control circuit to the coil side of the relay. This allows battery positive voltage from the WPR fuse to flow through the switch input side of the WPR relay and out to the switch input side of the WPR HI relay. Since the wiper high relay is de-energized and its switch contacts are normally closed to the low speed control circuit of the windshield wiper motor, the motor will operate at low speed.

Wiper motor low speed operation and the WPR relay can also be commanded ON/OFF by using a scan tool. Refer to CELL Link Error - Link target cell (cell ID 72864) is invalid for this publication..

Mist Operation

Windshield wiper/washer system MIST operation is identical to wiper Low operation, except that the mist switch is a press and release type switch. When the wiper switch is moved to the mist position and released, low speed wiper motor operation is started and will continue until 1 wipe cycle is complete. If the wiper switch is moved to the mist position and held, the wiper motor will operate in the low mode until the switch is released.

Delay Operation

Windshield wiper delay operation is a low speed wiper motor function with a variable delay interval between the wiper motor cycles. The delay interval is determined by a series of 6 resistors within the wiper/washer switch. The body control module (BCM) monitors the wiper switch low signal circuit to determine the delay interval between the low speed wiper motor wipe cycles.

High Speed Operation

When the wiper switch is in the high speed position, ground is applied through the windshield wiper switch high signal circuit to the body control module (BCM) indicating the wiper high speed request. In response to this signal, the BCM then energizes the WPR relay, as stated above, and the WPR HI relay by applying ground through the control circuit to the coil side of the relay. With the wiper high relay energized and its switch contacts closed to the high speed control circuit of the wiper motor, the motor will operate at high speed.

The wiper high speed relay can also be commanded ON/OFF by using a scan tool. However, before commanding the wiper motor high speed mode ON/OFF using a scan tool, the WPR relay must be energized by placing the wiper switch in the low speed position. Refer to CELL Link Error - Link target cell (cell ID 72864) is invalid for this publication..

Wash Operation

When the windshield Wash switch is pressed, ground is applied through the switch contacts and the windshield washer switch signal circuit to the body control module (BCM) indicating the windshield wash request. The BCM then energizes the WPR relay, as stated above, and the WSH relay by applying ground through the control circuit to the coil side of the relay. With the wash relay energized, battery voltage from the WPR fuse is applied through the switch side of the relay and out to the control circuit of the windshield washer fluid pump. The wiper motor will operate for 2 wipe cycles after the wash switch is released.

The WSH relay can also be commanded ON/OFF by using a scan tool. Refer to CELL Link Error - Link target cell (cell ID 72864) is invalid for this publication..

Park Position Operation

Windshield wiper motor park operation is controlled by the body control module (BCM) using an input from the park switch that is located within the wiper motor assembly. The BCM monitors the windshield wiper motor park switch signal circuit, to determine if the windshield wiper blades are at the bottom of the glass. During wiper operation, each time the wiper blades are at the bottom of the glass, the park switch is momentarily closed to ground signaling the BCM the wiper position. When the wiper switch is turned to the OFF position while the wiper motor is somewhere in mid-cycle, the BCM will continue to operate the motor until the wipers reach the park position. If the ignition is turned OFF while the wipers are in mid-cycle, the wipers will stop immediately where they are. The BCM will park the wipers the next time the ignition is turned ON.

Washer Fluid LOW ADD FLUID Message

The WASHER FLUID LOW ADD FLUID message is controlled by the instrument panel cluster (IPC) using an input from the washer fluid level switch. With the ignition in the ON position, the IPC applies ignition voltage through an internal resistor and the windshield washer fluid level signal circuit to the windshield washer fluid level switch. The IPC then monitors this voltage to determine the washer fluid level. With the washer fluid above a determined level, the washer fluid level switch is open and the IPC detects voltage on the signal circuit. When the washer fluid reaches the point where the driver should be informed that the washer fluid is low, the washer fluid level switch closes. When the washer fluid level switch is closed, the washer fluid level signal circuit is pulled low and the IPC displays the WASHER FLUID LOW ADD FLUID message on the driver information center (DIC). In order to prevent the WASHER FLUID LOW ADD FLUID message from being displayed while sloshing is occurring in the washer fluid container, the IPC is programed with a 1 minute delay before changing states of the WASHER FLUID LOW ADD FLUID message during an ignition cycle.

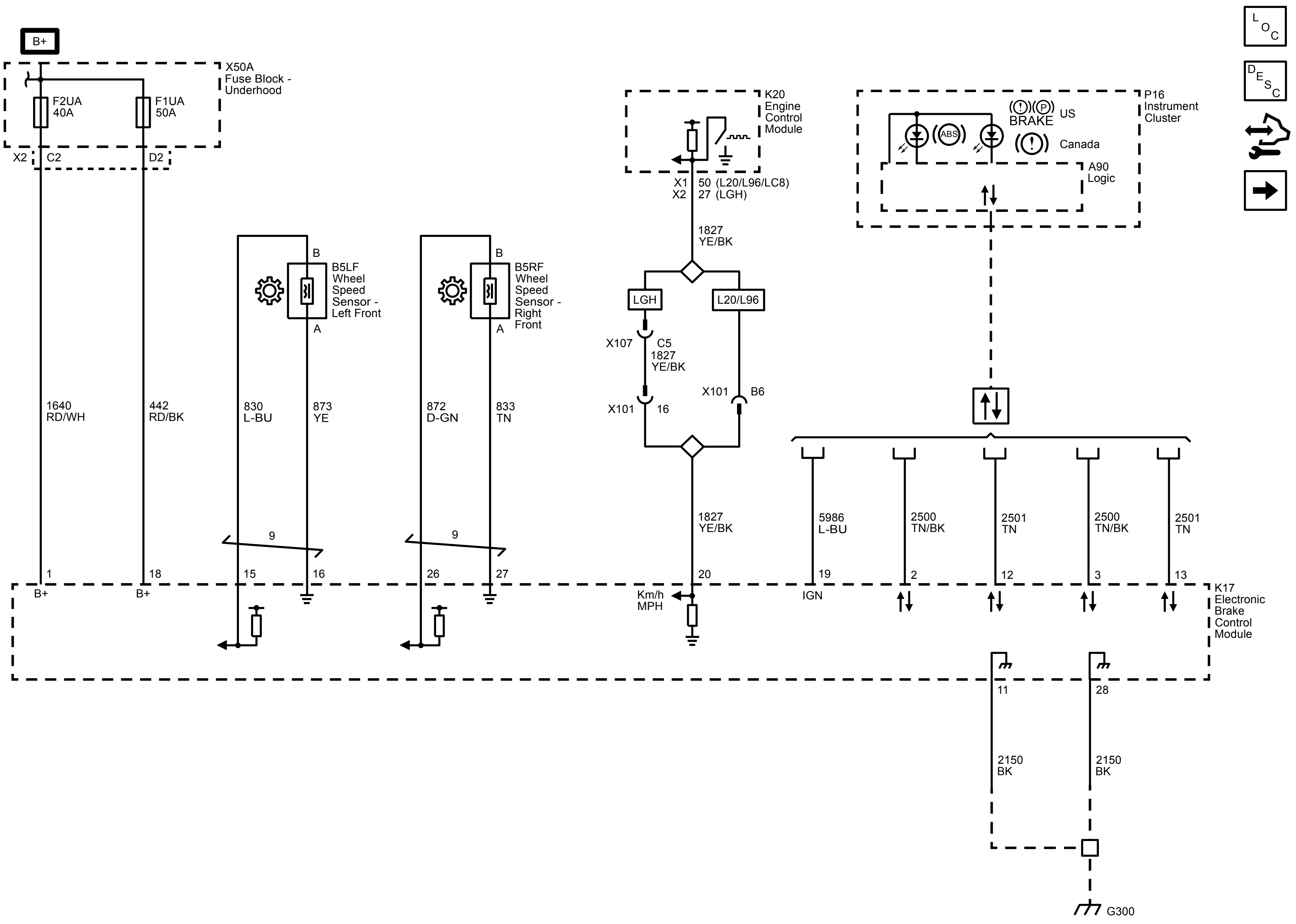
Brakes

Antilock Brake System

Schematic and Routing Diagrams

Antilock Brake System Schematics

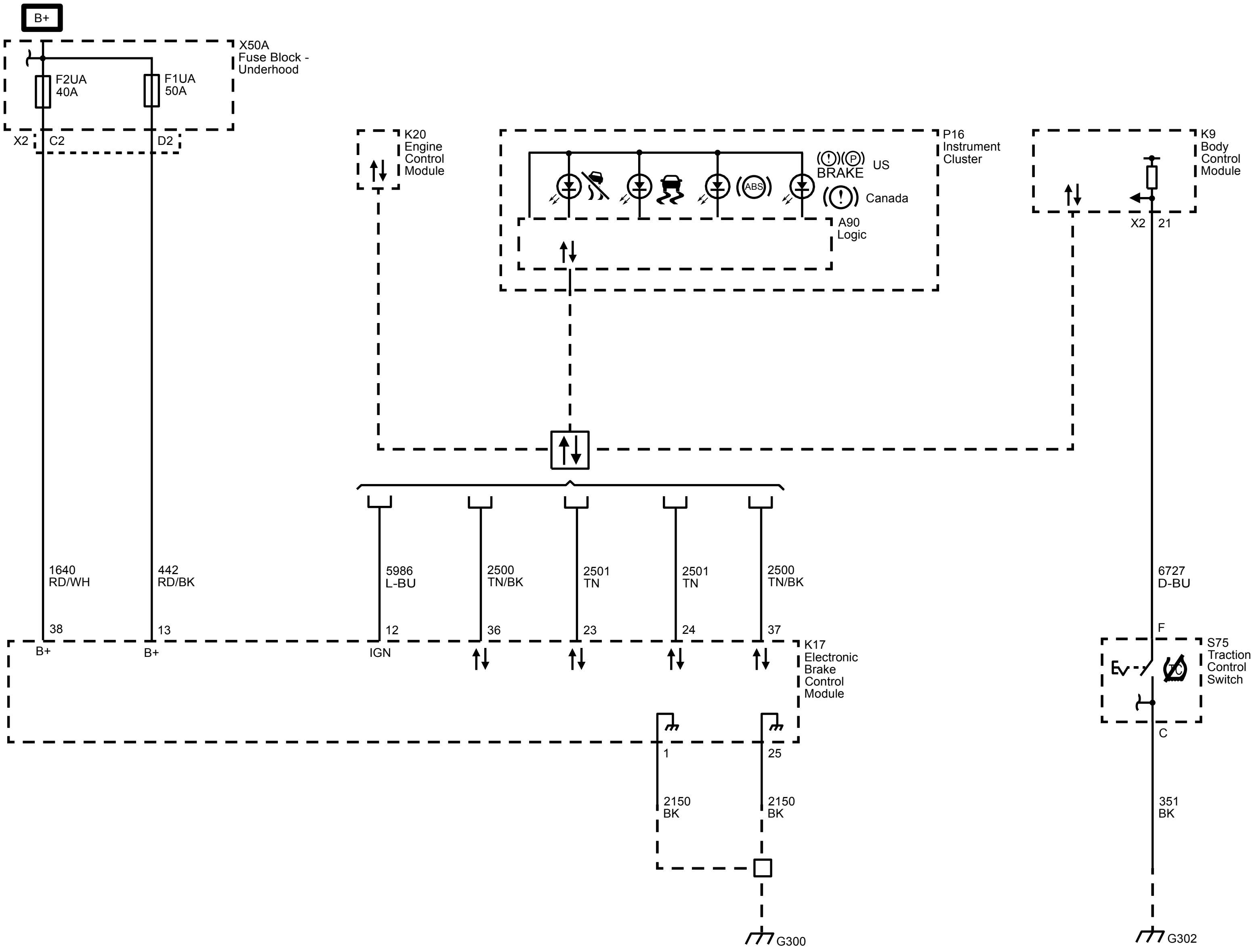
Power, Ground, Serial Data, Speed Signals and Indicators (without JL4)



B+
X50A
Fuse Block - Underhood
F2UA
40A
F1UA
50A
X2
C2
D2
1640
RD/WH
442
RD/BK
B5LF
Wheel Speed Sensor - Left Front
B
A
830
L-BU
873
YE
9
B5RF
Wheel Speed Sensor - Right Front
B
A
872
D-GN
833
TN
9
K20
Engine Control Module
X1
X2
50 (L20/L96/LC8)
27 (LGH)
1827
YE/BK
LGH
L20/L96
X107
C5
1827
YE/BK
X101
16
X101
B6
1827
YE/BK
P16
Instrument Cluster
ABS
BRAKE
US
Canada
A90
Logic
5986
L-BU
2500
TN/BK
2501
TN
2500
TN/BK
2501
TN
1
B+
18
B+
15
16
26
27
Km/h
MPH
20
19
IGN
2
12
3
13
K17
Electronic Brake Control Module
11
28
2150
BK
2150
BK
G300
L O C
D E S C

Power, Ground, Serial Data, Indicators and Traction Control Switch (JL4)

LOC
DESC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X50A
Fuse Block -
Underhood
F2UA
40A
F1UA
50A
X2
C2
D2
K20
Engine
Control
Module
P16
Instrument
Cluster
(!)(P)
BRAKE
US
(!)
Canada
ABS
A90
Logic
K9
Body
Control
Module
X2
21
1640
RD/WH
442
RD/BK
5986
L-BU
2500
TN/BK
2501
TN
2501
TN
2500
TN/BK
6727
D-BU
38
13
12
36
23
24
37
B+
B+
IGN
K17
Electronic
Brake
Control
Module
F
S75
Traction
Control
Switch
C
1
25
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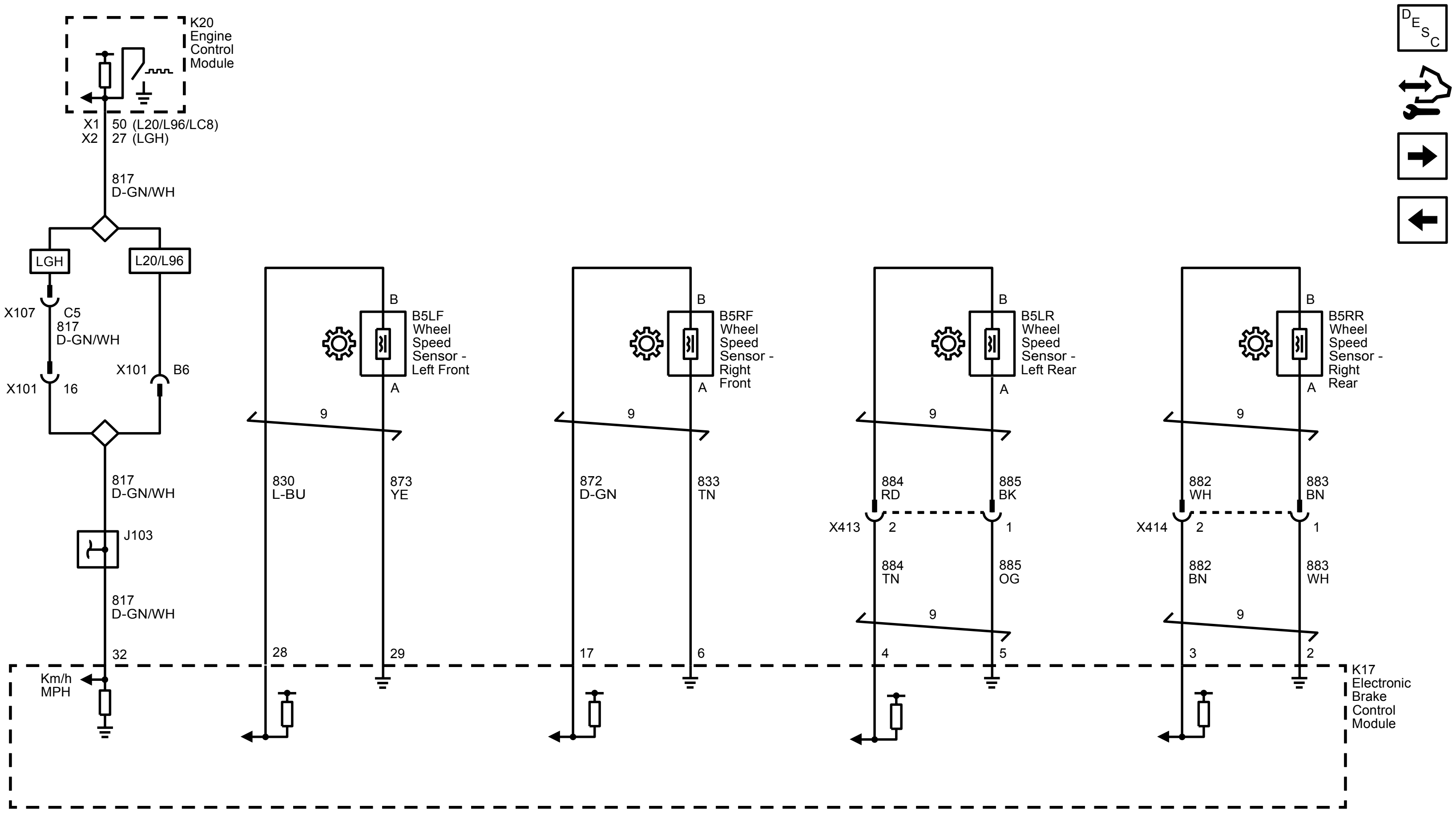
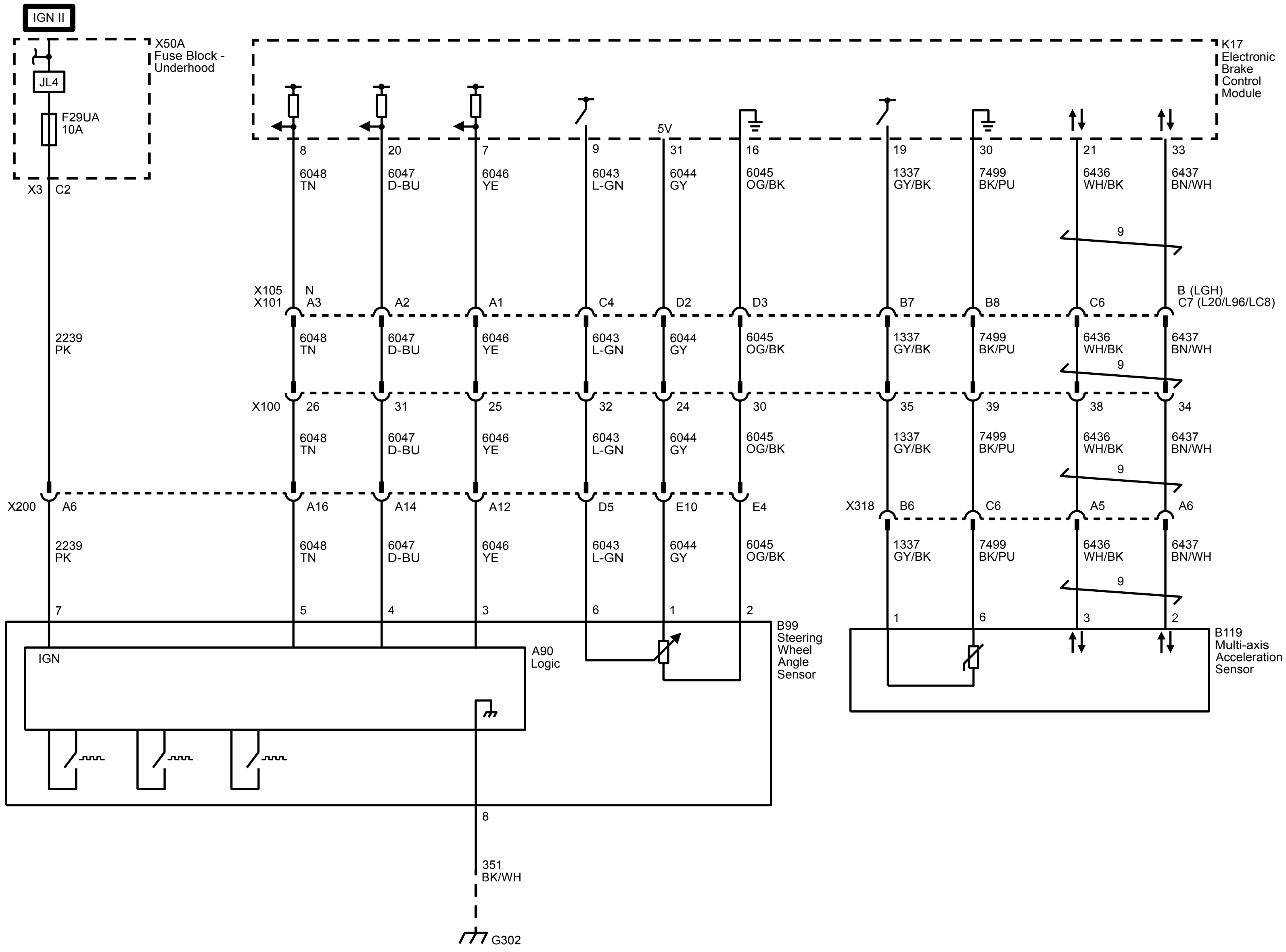
BK
2150
BK
351
BK
G300
G302

Speed Signals (JL4)


K20
Engine
Control
Module
X1
X2
50 (L20/L96/LC8)
27 (LGH)
817
D-GN/WH
LGH
L20/L96
X107
C5
817
D-GN/WH
X101
16
X101
B6
817
D-GN/WH
J103
817
D-GN/WH
32
Km/h
MPH
B
B5LF
Wheel
Speed
Sensor -
Left Front
A
9
830
L-BU
873
YE
28
29
B
B5RF
Wheel
Speed
Sensor -
Right
Front
A
9
872
D-GN
833
TN
17
6
B
B5LR
Wheel
Speed
Sensor -
Left Rear
A
9
884
RD
885
BK
X413
2
1
884
TN
885
OG
9
4
5
B
B5RR
Wheel
Speed
Sensor -
Right
Rear
A
9
882
WH
883
BN
X414
2
1
882
BN
883
WH
9
3
2
K17
Electronic
Brake
Control
Module

StabiliTrak Steering Wheel Position Inputs and Yaw and Lateral Accelerometer Sensor (JL4)


IGN II
X50A Fuse Block - Underhood
JL4
F29UA 10A
X3 C2
2239 PK
K17 Electronic Brake Control Module
5V
8 6048 TN
20 6047 D-BU
7 6046 YE
9 6043 L-GN
31 6044 GY
16 6045 OG/BK
19 1337 GY/BK
30 7499 BK/PU
21 6436 WH/BK
33 6437 BN/WH
9
X105 X101
N A3
A2
A1
C4
D2
D3
B7
B8
C6
B (LGH) C7 (L20/L96/LC8)
X100
26
31
25
32
24
30
35
39
38
34
X200 A6
A16
A14
A12
D5
E10
E4
X318 B6
C6
A5
A6
7
5
4
3
6
1
2
IGN
A90 Logic
B99 Steering Wheel Angle Sensor
1
6
3
2
B119 Multi-axis Acceleration Sensor
8
351 BK/WH
G302

Description and Operation

ABS Description and Operation

Vehicles with RPO JL4 are equipped with an EBC 445V ABS/DRP/TCS/VSES module.

This module provides the following vehicle performance enhancement systems.

- ABS
- Dynamic Rear Proportioning (DRP)
- Traction Control System (TCS)
- Vehicle Stability Enhancement System (VSES)

The following components are involved in the operation of the above systems.

- Electronic brake control module (EBCM)—The EBCM controls the system functions and detects failures.

  The EBCM contains the following components.

  - System relay—The system relay is internal to the EBCM. The system relay is energized when the ignition is ON. The system relay supplies battery positive voltage to the valve solenoids and to the ABS pump motor. This voltage is referred to as system voltage.
  - Solenoids—The solenoids are commanded ON and OFF by the EBCM to operate the appropriate valves in the brake pressure modulator valve (BPMV).
  - Longitudinal accelerometer—The EBCM uses the longitudinal accelerometer to determine the actual straight-line acceleration of the vehicle.

- BPMV—The BPMV uses a 4-circuit configuration to control hydraulic pressure to each wheel independently.

  The BPMV contains the following components.

  - ABS pump motor and pump
  - Four isolation valves
  - Four dump valves
  - Two traction control isolation valves
  - Two traction control supply valves
  - A master cylinder pressure sensor
  - A front low-pressure accumulator
  - A rear low-pressure accumulator

- Active wheel speed sensors—The EBCM sends a 12-volt reference signal to each wheel speed sensor. As the wheel spins, the wheel speed sensor produces a digital square wave DC signal voltage. The wheel speed sensor increases the signal frequency as the wheel speed increases, but does not increase the signal amplitude.
- Passive wheel speed sensors—As the wheels spin, toothed rings interrupt magnetic fields in the wheel speed sensors. This causes each wheel speed sensor to generate an analog AC signal. The EBCM uses these AC signals to calculate the wheel speed. Any imperfections in the toothed ring, such as a missing or damaged tooth, can cause an inaccurate wheel speed sensor signal.
- The vehicle speed sensor (VSS) also called the output speed sensor (OSS) may be found in the transmission or transfer case and creates a AC voltage signal that increases in frequency as vehicle speed increases. The transmission control module (TCM) receives and process this signal. The TCM provides a digital VSS signal on the data communication line to the engine control module (ECM) and other controllers connected to the data line. The ECM converts the data from the vehicle speed sensor to a 128K pulses/mile signal. The electronic brake control module (EBCM) uses the vehicle speed signal from the ECM in order to calculate the rear wheel speed.
- Traction control switch—VSES and the engine torque reduction function of traction control system are manually disabled by pressing and holding the traction control switch for at least 5 seconds. These functions can be re-enabled with a quick press and release of the traction control switch.
- Lateral accelerometer—The EBCM uses the lateral accelerometer to determine the sideways acceleration of the vehicle. The lateral accelerometer is packaged with the yaw rate sensor as a single component.
- Master cylinder pressure sensor—The master cylinder pressure sensor is located within the BPMV. The master cylinder pressure sensor uses a 5-volt reference and generates an output signal proportionate to the hydraulic fluid pressure which is present in the front brake circuit at the master cylinder.
- Yaw rate sensor—The EBCM uses the yaw rate sensor to determine the rate of rotation along the vehicle's vertical axis. The yaw rate sensor is packaged with the lateral accelerometer as a single component.
- Steering wheel position sensor—The EBCM receives several inputs from the steering wheel position sensor. Three digital square wave signal inputs are wired directly to the EBCM harness connector, however, only signals A and B are used or monitored. The failure of the index pulse signal does not effect VSES function. The EBCM also monitors an analog steering wheel position sensor signal. Battery voltage is supplied to the digital portion of the steering wheel position sensor by the ignition 1 circuit. The analog portion of the steering wheel position sensor is supplied a 5-volt reference from the EBCM.

Antilock Brake System (ABS)

When wheel slip is detected during a brake application, an ABS event occurs. During antilock braking, hydraulic pressure in the individual wheel circuits is controlled to prevent any wheel from slipping. A separate hydraulic line and specific solenoid valves are provided for each wheel. The ABS can decrease, hold, or increase hydraulic pressure to each wheel. The ABS does not, however, increase hydraulic pressure above the amount which is transmitted by the master cylinder during braking.

During antilock braking, a series of rapid pulsations is felt in the brake pedal. These pulsations are caused by the rapid changes in position of the individual solenoid valves as the electronic brake control module (EBCM) responds to wheel speed sensor inputs and attempts to prevent wheel slip. These pedal pulsations are present only during antilock braking and stop when normal braking is resumed or when the vehicle comes to a stop. A ticking or popping noise may also be heard as the solenoid valves cycle rapidly. During antilock braking on dry pavement, intermittent chirping noises may be heard as the tires approach slipping. These noises and pedal pulsations are considered normal during antilock operation.

Vehicles equipped with ABS may be stopped by applying normal force to the brake pedal. Brake pedal operation during normal braking is no different than that of previous non-ABS systems. Maintaining a constant force on the brake pedal provides the shortest stopping distance while maintaining vehicle stability. The typical ABS activation sequence is as follows.

Pressure Hold

The EBCM closes the isolation valve and keeps the dump valve closed in order to isolate the slipping wheel when wheel slip occurs. This holds the pressure steady on the brake so that the hydraulic pressure does not increase or decrease.

Pressure Decrease

If a pressure hold does not correct the wheel slip condition, a pressure decrease occurs. The EBCM decreases the pressure to individual wheels during deceleration when wheel slip occurs. The isolation valve is closed and the dump valve is opened. The excess fluid is stored in the accumulator until the pump can return the fluid to the master cylinder or fluid reservoir.

Pressure Increase

After the wheel slip is corrected, a pressure increase occurs. The EBCM increases the pressure to individual wheels during deceleration in order to reduce the speed of the wheel. The isolation valve is opened and the dump valve is closed. The increased pressure is delivered from the master cylinder.

Dynamic Rear Proportioning (DRP)

The dynamic rear proportioning (DRP) is a control system that enhances the hydraulic proportioning function of the mechanical proportioning valve in the base brake system. The DRP control system is part of the operation software in the electronic brake control module (EBCM). The DRP uses active control with existing ABS in order to regulate the vehicle's rear brake pressure.

Traction Control System (TCS)

Traction is maintained by limiting the amount of torque produced by the drivetrain and also by applying brake pressure to slipping wheels during acceleration. This causes power to transfer through the driveline to wheels which are not slipping. The transfer case used on four wheel drive vehicles equipped with vehicle stability enhancement system (VSES) does not contain a viscous coupling and therefore allows the front and rear drive shafts to turn at substantially different speeds. This front to rear differential must be kept within acceptable parameters by the VSES. The two methods of traction control are performed as follows.

Engine Torque Reduction

The electronic brake control module (EBCM) uses a 5-volt pulse width modulated (PWM) signal to request that the powertrain control module (PCM) reduce the amount of torque to the drive wheels. The PCM reduces torque to the drive wheels by retarding spark timing and commanding the throttle actuator control. The PCM uses a 12-volt PWM signal to report to the EBCM the amount of torque that is being delivered to the drive wheels. Engine torque reduction is mostly used to reduce vehicle speed during VSES events and during traction control system events when the brakes are in danger of being overheated or when the driven wheels are slipping at the same rate. Engine torque reduction can be disabled by pressing the traction control switch.

Brake Pressure Application

The EBCM uses brake pressure application to control traction by transferring torque through the driveline to wheels which are not slipping. The ABS pump motor and appropriate valve solenoids are commanded ON and OFF to apply brake pressure to the slipping wheels. Brake pressure application is used in an attempt to maintain equal wheel speed sensor signals at the driven wheels.

The EBCM does not allow excessive brake pressure application due to the fact that the solenoid coils or the brakes may become overheated, damaging the EBCM or reducing the driver's ability to stop the vehicle. Estimated coil and brake temperatures are determined by a calculation in the EBCM software. Overheated solenoid coils cause all brake pressure application to become disabled and the stability system disabled message to be displayed. Overheated brakes cause brake pressure application during traction control events to disable, yet the VSES remains functional and as long as the engine torque reduction is enabled, there is no indication to the driver when this occurs and no DTC sets.

Vehicle Stability Enhancement System (VSES)

The vehicle stability enhancement system (VSES) provides added stability during aggressive maneuvers. Yaw rate is the rate of rotation about the vehicle's vertical axis. The VSES is activated when the electronic brake control module determines that the desired yaw rate does not match the actual yaw rate as measured by the yaw rate sensor.

The desired yaw rate is calculated by the EBCM using, primarily, the following inputs.

- The position of the steering wheel
- The speed of the vehicle
- The lateral, or sideways acceleration of the vehicle

The difference between the desired yaw rate and the actual yaw rate is the yaw rate error, which is a measurement of oversteer or understeer. When a yaw rate error is detected, the EBCM attempts to correct the vehicle's yaw motion by applying brake pressure to one or more of the wheels. The amount of brake pressure which is applied varies, depending on the correction required. The engine torque may be reduced also, if it is necessary to slow the vehicle while maintaining stability.

VSES activations generally occur in turns during aggressive driving. When braking during VSES activation, the pedal may pulsate. The brake pedal pulsates at a higher frequency during VSES activation than during ABS activation.

System Pre-Fill

This vehicle is equipped with a four wheel disc brake system. Disc brake calipers are designed so that when hydraulic pressure is not being applied, the caliper piston lip seal causes the piston to retract, creating measurable clearance between the brake pads and the rotor. Since a small amount of brake fluid must be delivered to the calipers before any actual braking occurs, the vehicle stability enhancement system (VSES) uses system pre-fill to prevent delayed brake application and enhance system performance. If the electronic brake control module (EBCM) determines that a brake application is likely to be needed, the ABS pump motor runs momentarily to take up any clearances between the brake pads and the rotor. By monitoring the master cylinder pressure sensor feedback signal, the EBCM can determine when the brake pads are contacting the rotor. The EBCM then holds this small amount of pressure in the system. A VSES brake application may or may not occur after pre-fill is complete. If the EBCM determines that a brake application is no longer pending, the pre-fill pressure is released and the VSES system returns to the normal, monitoring state. The reason that we must understand system pre-fill is that pre-fill may lead to customer concerns. Any time the ABS pump motor is active, the motor draws a large amount of current, and may cause the vehicle lighting systems to dim noticeably. When ABS activity occurs, most drivers understand that this activity is the cause of noises and dimming lights. Likewise, when an actual VSES event occurs, the Stability System Active message is displayed, which helps drivers understand why these other conditions occur. Since pre-fill is not an actual VSES event, but preparation for a pending event, no message is displayed. Also, system noise during pre-fill is very minimal. A customer may become concerned with what is perceived to be an electrical problem, due to the intermittent dimming lights, when, in fact, no malfunction exists and the condition is normal.

Power-up Self-Test

The electronic brake control module (EBCM) is able to detect many malfunctions whenever the ignition is ON. However, certain failures cannot be detected unless active diagnostic tests are performed on the components. Shorted solenoid coil or motor windings, for example, cannot be detected until the components are commanded ON by the EBCM. Therefore, a power-up self-test is required at the beginning of each ignition cycle to verify correct operation of components before the various control systems can be enabled. The EBCM performs the first phase of the power-up self-test when the ignition is first turned ON. The system relay, solenoids and the ABS pump motor are commanded ON and OFF to verify proper operation and the EBCM verifies the ability to return the system to base braking in the event of a failure. The master cylinder pressure sensor performs a self-test by sending a series of specific voltage signals to the EBCM, each for a predetermined amount of time. This phase of the power-up self-test may be heard by the driver, depending on how soon the engine is cranked and started after turning

ON the ignition. The second phase of the power-up self-test begins when the vehicle is driven at a speed greater than 16 km/h (10 mph) and the EBCM has not detected any traction control system (TCS)/vehicle stability enhancement system (VSES) related malfunctions thus far. During this phase, the ABS pump is tested to verify the ability to build adequate pressure to perform brake pressure application during certain TCS and VSES events. When the brake switch indicates that the brake is not applied and the master cylinder pressure is detected as being low, the EBCM proceeds with the test. The EBCM isolates all of the wheels by closing the 4 isolation valves. The ABS pump is then commanded ON while the EBCM monitors the master cylinder pressure sensor input. The ABS pump must build approximately 248 kPa (36 psi) of hydraulic pressure within 1 second or the test is failed. If the EBCM uses brake pressure application to perform TCS or VSES prior to the second phase of the power-up self-test, the ABS pump is tested at this time and the second phase of the test is not required. Due to the fact that all of the wheels are isolated during the second phase of the test, the test must be aborted if the brake is applied while the test is being performed. Occasionally, the driver may detect this by experiencing a momentary hard pedal.

VSES Sensors Initialization

The vehicle stability enhancement system (VSES) sensors values may vary slightly due to differences in temperature, sensor mounting, connector resistances, manufacturing, etc. Since the VSES is a very sensitive and precise control system, it is imperative that the electronic brake control module (EBCM) be able to accurately equate a given sensor voltage with an actual unit of measurement. For example, the yaw rate signal of one vehicle may be 2.64 volts at +18.0 deg/sec yaw rate while the yaw rate signal of another vehicle may be 2.64 volts at +17.5 deg/sec yaw rate. Therefore, at the beginning of each ignition cycle, the EBCM must perform an initialization procedure to observe how the VSES sensors are correlated with each other and also to determine what each sensor value is when the applicable unit of measurement equals 0. This voltage is referred to as the sensor bias voltage. Although some activation of the VSES system may occur if required to prior to full initialization, the system does not give optimum performance until the sensors are fully initialized.

The following VSES sensors require initialization.

- The yaw rate sensor
- The lateral accelerometer
- The longitudinal accelerometer
- The master cylinder pressure sensor
- The steering wheel position sensor

When the vehicle speed is greater than 25 km/h (15 mph), full sensor initialization must occur during 3 km (1.8 mi) of driving or 1 km (0.6 mi) of straight and stable driving, whichever occurs first. Although an attempt at initialization may fail due to driving conditions, such as driving on a very winding road, failed initialization is usually caused by a sensor bias voltage which is not within an acceptable range. Often, a DTC sets soon after a failed initialization attempt. The stability system not ready indicator illuminates when sensor initialization fails.

ECE 13 Response

The electronic brake control module (EBCM) illuminates the ABS indicator when a malfunction which disables ABS is detected. Usually, the ABS indicator is turned OFF during the following ignition cycle unless the fault is detected during that ignition cycle. However, the setting of a wheel speed sensor related DTC causes the ABS indicator to remain illuminated during the following ignition cycle until the vehicle is operated at a speed greater than 13 km/h (8 mph). This allows the EBCM to verify that no malfunction exists, before turning OFF the ABS indicator. This reaction occurs even if the ABS indicator turns OFF when the scan tool is used to clear the DTCs. When repairing these vehicles, it is important to ensure that the ECE 13 response has occurred and that the ABS indicator does not illuminate after returning the vehicle to the customer. It is also important to verify that ECE 13 is not the cause of an ABS indicator which is illuminated when no DTCs are set, before attempting to diagnose other possible causes.

Driver Information Indicators and Messages

The following indicators are used to inform the driver of several different factors.

Brake Warning Indicator

The instrument panel cluster (IPC) illuminates the brake warning indicator when the following occurs.

- The IPC performs the bulb check.
- The EBCM detects an ABS-disabling malfunction which also disables dynamic rear proportioning and sends a serial data message to the IPC requesting illumination.
- The electronic brake control module (EBCM) detects a low brake fluid condition or a base brake pressure differential and sends a serial data message to the IPC requesting illumination.
- The body control module (BCM) detects that the park brake is engaged. The IPC receives a serial data message from the BCM requesting illumination. The brake warning indicator flashes at a rate of approximately twice per second when the park brake is engaged.

ABS Indicator

The IPC illuminates the ABS indicator when the following occurs.

- The IPC performs the bulb check.
- The IPC detects a loss of serial data communication with the EBCM.
- The EBCM detects an ABS-disabling malfunction and sends a serial data message to the IPC requesting illumination.
- A DTC is set during the previous ignition cycle which requires an ECE 13 response at the beginning of the current ignition cycle. The EBCM sends a serial data message to the IPC requesting illumination.

Traction Off Indicator

The IPC illuminates the traction off indicator when the following occurs.

- The IPC performs the bulb check.
- The EBCM disables engine torque reduction due to a malfunction and sends a serial data message to the IPC requesting illumination.
- The IPC flashes the traction off indicator if wheel slip is detected while engine torque reduction and brake pressure application are both disabled.
- The driver manually disables VSES and engine torque reduction by pressing the traction control switch. The EBCM sends a serial data message to the IPC requesting illumination.

Service Brake System Message

The service brake system message is displayed whenever the red brake warning indicator is illuminated.

Service Stability System Message

The message center displays the service stability system message when any one of many VSES-disabling DTCs is set. The EBCM sends a serial data message to the IPC requesting this display.

Stability SYS Active Message

The message center displays the stability system active message when a traction control or VSES event occurs. The EBCM sends a serial data message to the IPC request this display.

Stability SYS Ready Message

The message center displays the stability system ready message when the system has initialize.

Stability SYS Disabled Message

The message center displays the stability system disabled message when one or more of the following conditions exists.

- The transfer case is shifted into 4 LO. The EBCM sends a serial data message to the IPC requesting illumination
- VSES sensor initialization time is excessive. The EBCM sends a serial data message to the IPC requesting this display.
- The EBCM detects an excessively low or excessively high ignition voltage. The EBCM sends a serial data message to the IPC requesting this display.
- The estimated temperature of any solenoid coil exceeds an acceptable limit. The EBCM sends a serial data message to the IPC requesting this display.
- The EBCM detects a failed brake switch. The EBCM sends a serial data message to the IPC requesting this display. A DTC sets when this condition exists.
- The PCM is not able to perform engine torque reduction. The EBCM sends a serial data message to the IPC requesting this display. DTCs set when this condition exists.
- The driver manually disables the VSES and engine torque reduction by pressing the traction control switch. The EBCM sends a serial data message to the IPC requesting illumination.
- The powertrain control module (PCM) is not able to perform engine torque reduction. The EBCM sends a serial data message to the IPC requesting illumination. DTCs set when this condition exists.
- The EBCM detects that the brake fluid level is low or a base brake pressure differential exists. These two conditions are not distinguishable by the EBCM. The EBCM sends a serial data message to the IPC requesting this display.
- Serial data communication between the EBCM and any of several other control modules is interrupted. The EBCM sends a serial data message to the IPC requesting this display or the IPC displays the message when communication with the EBCM is interrupted.

Traction Active Message

The drive information center displays the traction active message when engine torque reduction or brake pressure application is required to maintain traction. The EBCM sends a serial data message to the IPC requesting this display.

Traction SYS LIMITED

The drive information center displays the traction LIMITED message when engine torque reduction or brake pressure application is required to maintain traction. The EBCM sends a serial data message to the IPC requesting this display.

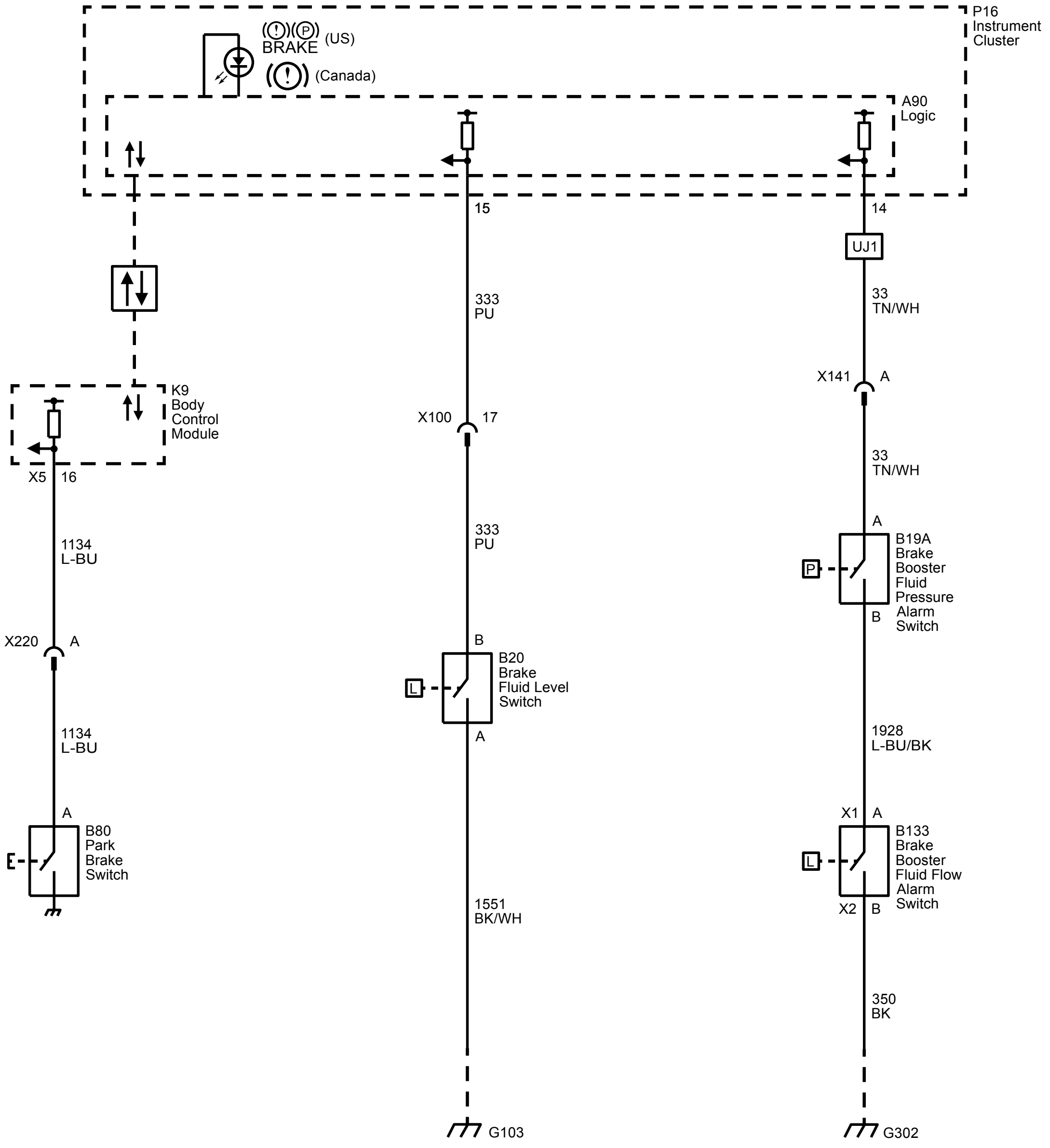
Brakes

Hydraulic Brakes

Schematic and Routing Diagrams

Hydraulic Brake Schematics

Hydraulic Brake


(US)
BRAKE
(Canada)
P16
Instrument
Cluster
A90
Logic
15
14
UJ1
333
PU
33
TN/WH
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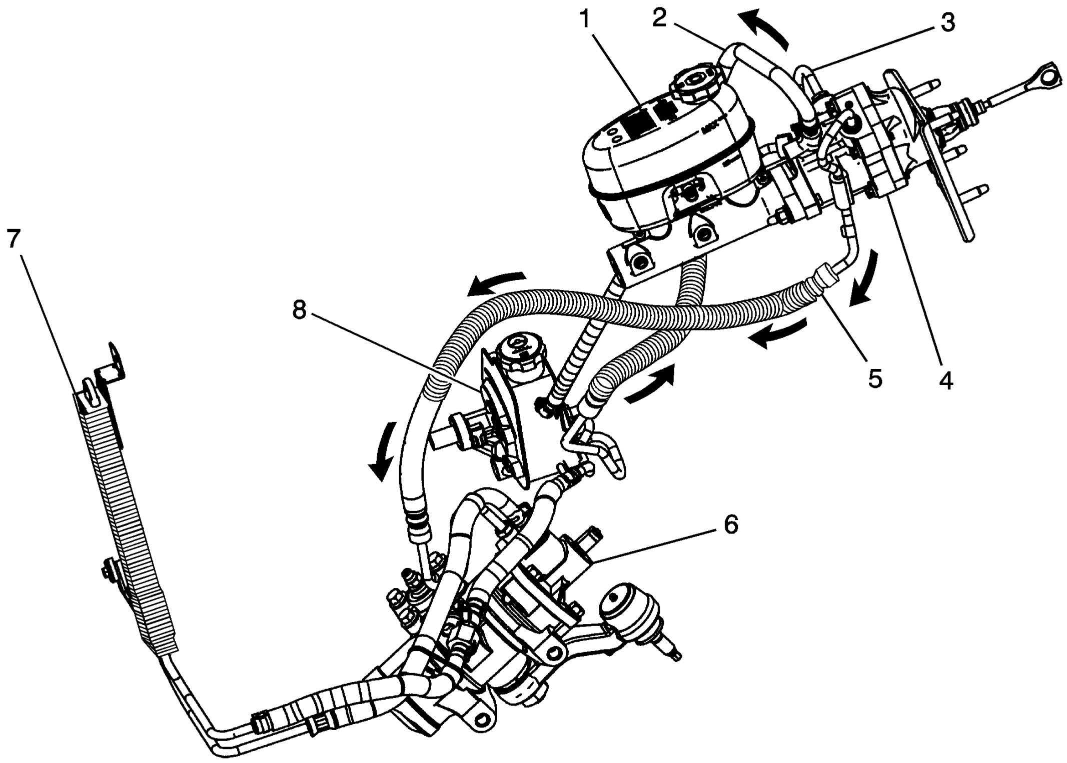
A
K9
Body
Control
Module
X100
17
X5
16
1134
L-BU
A
B19A
Brake
Booster
Fluid
Pressure
Alarm
Switch
B
X220
A
B20
Brake
Fluid Level
Switch
1928
L-BU/BK
B80
Park
Brake
Switch
X1
X2
B133
Brake
Booster
Fluid Flow
Alarm
Switch
1551
BK/WH
350
BK
G103
G302

Description and Operation

Brake Assist System Description and Operation



System Component Description

The brake assist system consists of the following:

Brake Pedal: Receives, multiplies and transfers brake system input force from driver.

Brake Pedal Pushrod: Transfers multiplied input force received from brake pedal to brake booster.

Hydraulic Brake Booster: Uses power steering fluid pressure to decrease effort required by driver when applying brake system input force.

Power Steering System: Supplies pressurized power steering fluid used by hydraulic brake booster to decrease brake pedal effort.

System Operation

The hydraulic brake boost system uses fluid from the power steering pump (8) through the hydraulic boost inlet hose (3) and to the brake booster assembly (4). In addition to supplying the brake system with fluid for increased apply, the power steering pump is also connected to the power steering gear (6) and cooler (7).

The steering pump (8) is a continuous flow device supplying approximately 3 GPM at 1000 RPM, at the pump shaft. The fluid flows through the booster spool valve, then the return hose (5), and then to the steering gear (6). Pressure is produced by applying the brake pedal, resulting in the spool valve being actuated, internal to the hydraulic brake booster. The spool valve produces a marginal restriction that causes pressure in the booster (4) to rise and forces the power piston and therefore the output rod forward to generate force and motion at the master cylinder (1). The brake corners are actuated by the fluid impulse generated by the master cylinder (1). Internal blow by, or pressure relief, is directed to the low pressure return hose (2) back to the power steering pump (8).

Brake Warning System Description and Operation

Brake Warning Indicator

The instrument panel cluster (IPC) illuminates the brake warning indicator when one or more of the following occurs:

- The body control module (BCM) detects that the park brake is engaged. The IPC receives a serial data message from the BCM requesting illumination.
- The electronic brake control module (EBCM) detects a low brake fluid condition. The IPC receives a serial data message from the EBCM requesting illumination.
- The electronic brake control module (EBCM) detects a closed brake pressure differential switch. The IPC receives a serial data message from the EBCM requesting illumination.
- The EBCM detects an ABS malfunction which disables dynamic rear proportioning (DRP). The IPC receives a serial data message from the EBCM requesting illumination.
- The IPC detects a closed power brake booster alarm switch and closed power brake booster fluid flow alarm switch. The IPC illuminates the brake warning indicator and sends a serial data message to the radio requesting the brake warning alarm.
- The IPC performs the bulb check at the start of each ignition cycle. The brake warning indicator illuminates for approximately 3 seconds before turning OFF.
- The IPC detects a loss of serial data communication with the BCM or with the EBCM.

Hydraulic Brake System Description and Operation

System Component Description

The hydraulic brake system consists of the following:

Hydraulic Brake Master Cylinder Fluid Reservoir: Contains supply of brake fluid for the hydraulic brake system.

Hydraulic Brake Master Cylinder: Converts mechanical input force into hydraulic output pressure.

Hydraulic output pressure is distributed from the master cylinder through 2 hydraulic circuits, supplying diagonally opposed wheel apply circuits.

Hydraulic Brake Pressure Balance Control System: Regulates brake fluid pressure delivered to hydraulic brake wheel circuits, in order to control the distribution of braking force.

Pressure balance control is achieved through dynamic rear proportioning (DRP), which is a function of the ABS modulator. Refer to ABS Description and Operation for specific information on the operation of DRP.

Hydraulic Brake Pipes and Flexible Brake Hoses: Carries brake fluid to and from hydraulic brake system components.

Hydraulic Brake Wheel Apply Components: Converts hydraulic input pressure into mechanical output force.

System Operation

Mechanical force is converted into hydraulic pressure by the master cylinder, regulated to meet braking system demands by the pressure balance control system, and delivered to the hydraulic brake wheel circuits by the pipes and flexible hoses. The wheel apply components then convert the hydraulic pressure back into mechanical force which presses linings against rotating brake system components.

Brakes

Park Brake

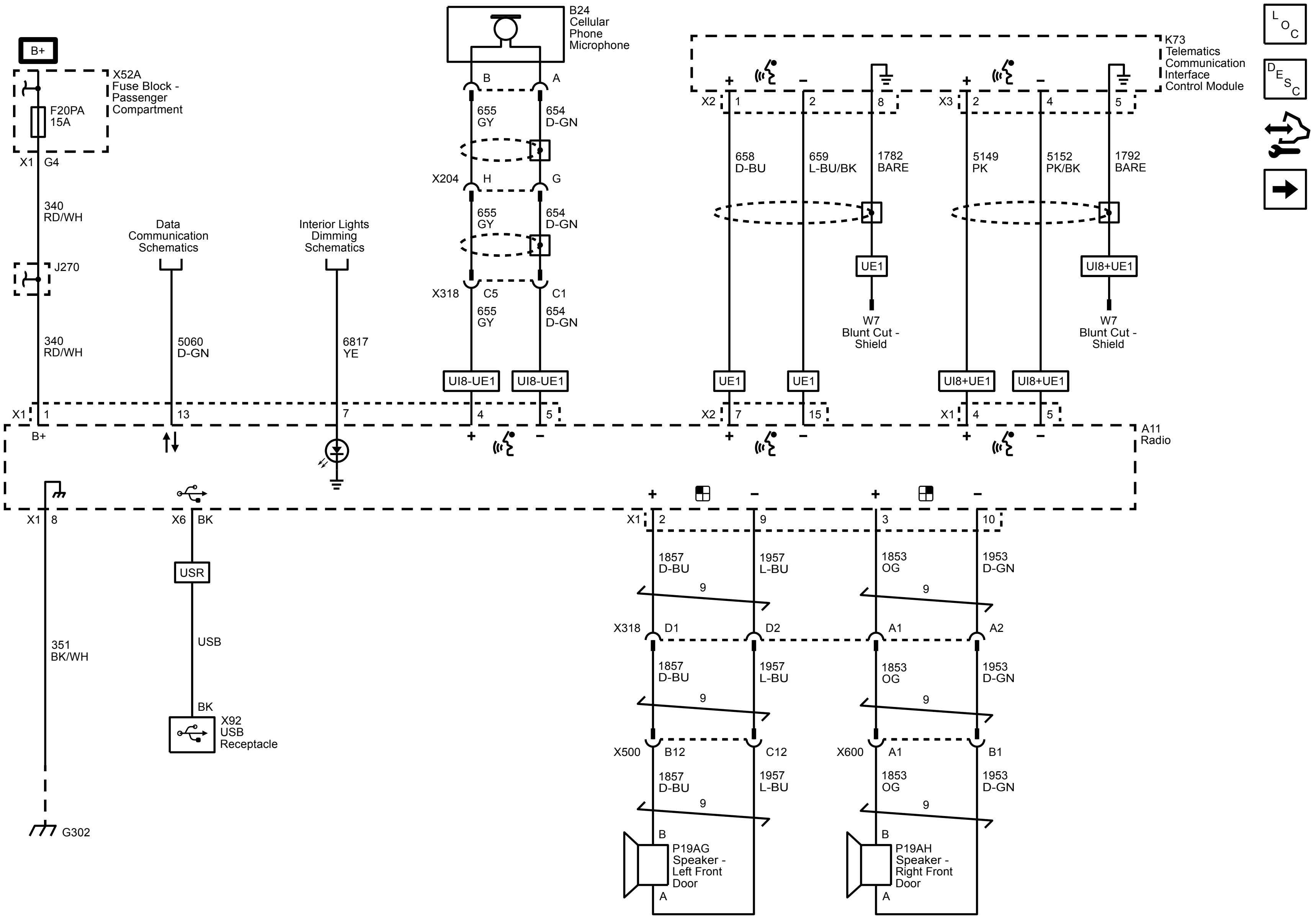
Driver Information and Entertainment

Cellular, Entertainment, and Navigation

Schematic and Routing Diagrams

Radio/Navigation System Schematics

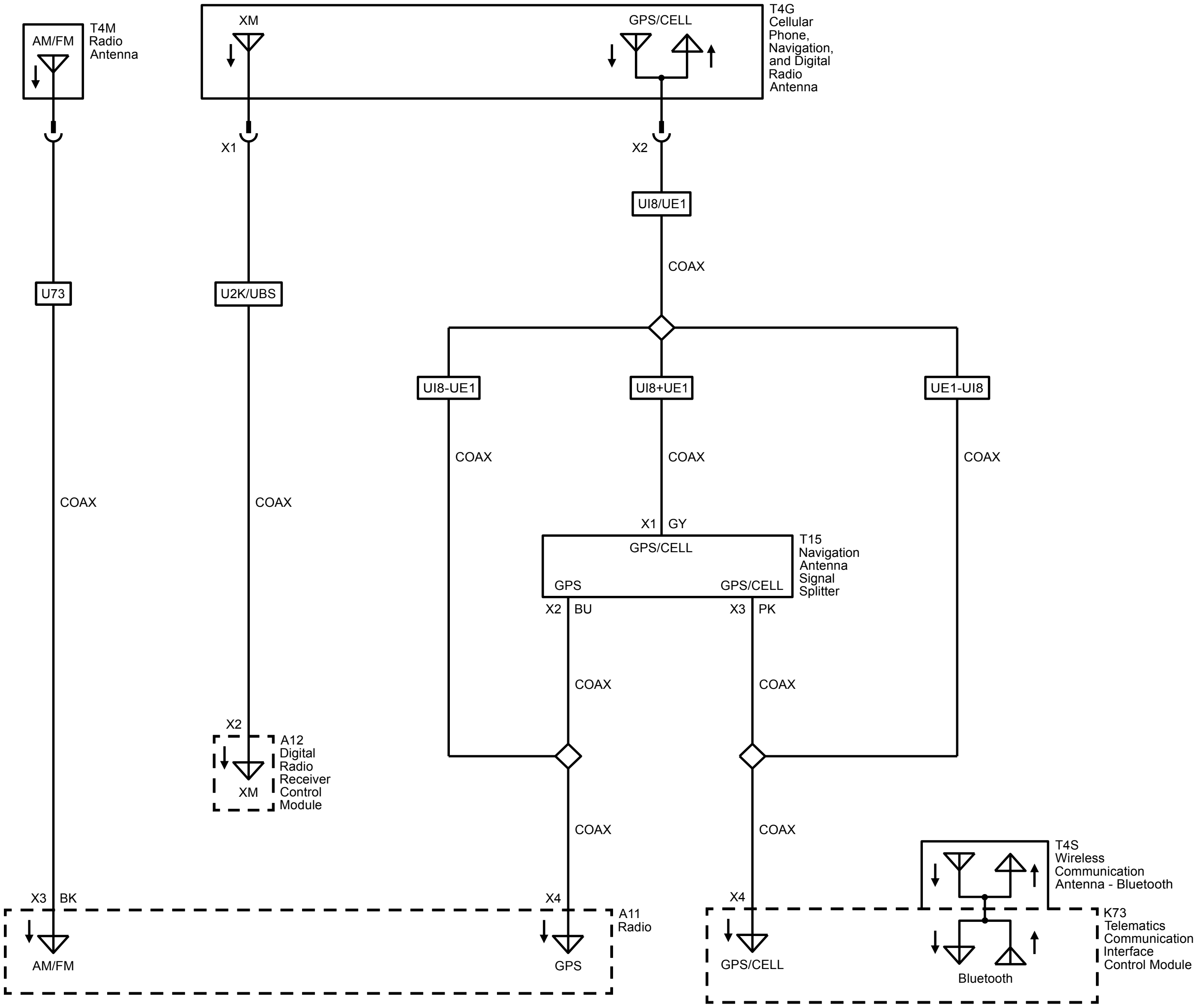
Power, Ground, Serial Data, Microphone, and Front Speakers



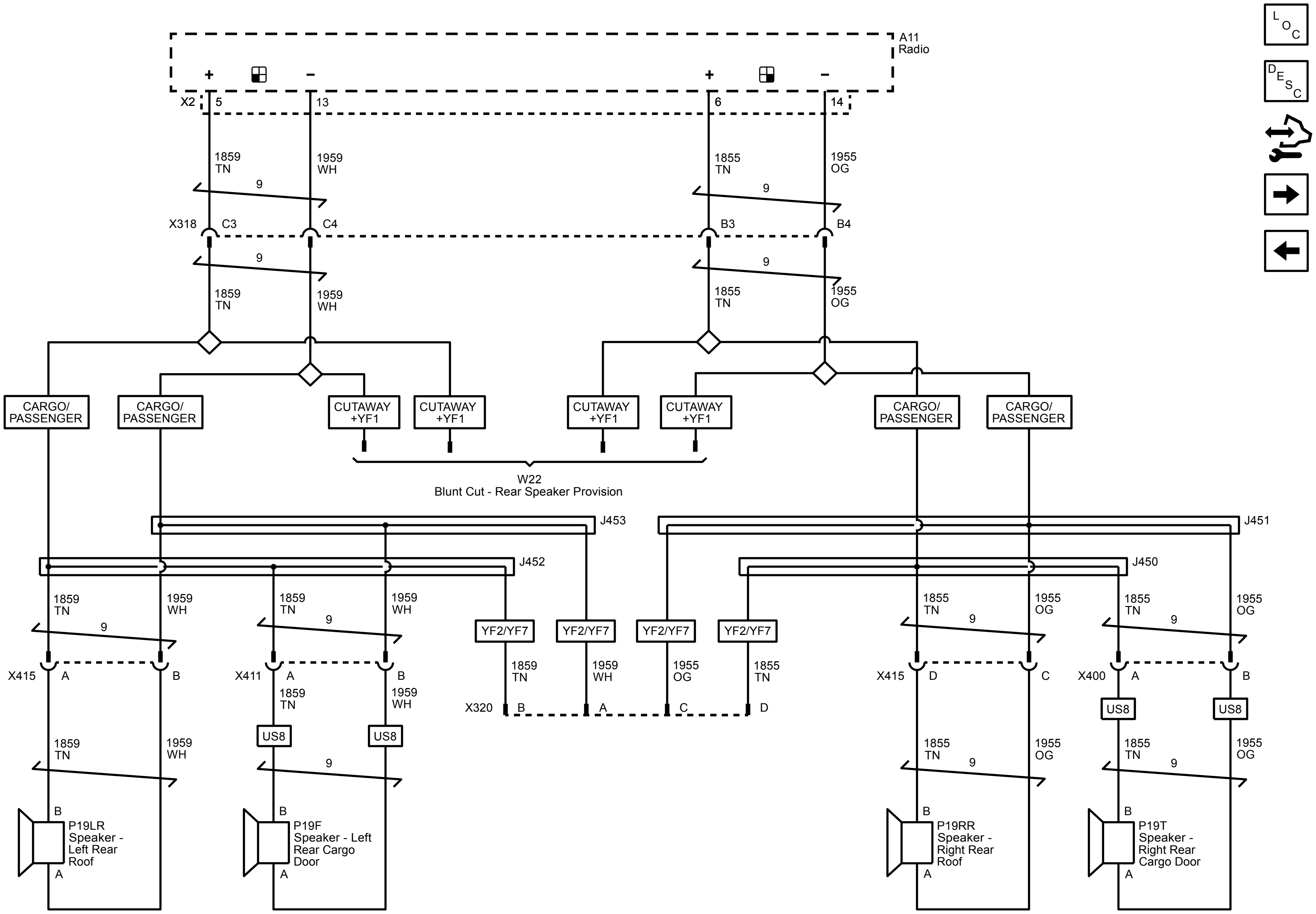
B+
X52A
Fuse Block - Passenger Compartment
F20PA 15A
X1 G4
340 RD/WH
J270
340 RD/WH
Data Communication Schematics
5060 D-GN
Interior Lights Dimming Schematics
6817 YE
B24 Cellular Phone Microphone
B A
655 GY
654 D-GN
X204 H G
655 GY
654 D-GN
X318 C5 C1
655 GY
654 D-GN
UI8-UE1
UI8-UE1
K73 Telematics Communication Interface Control Module
X2 1 2 8
658 D-BU
659 L-BU/BK
1782 BARE
X3 2 4 5
5149 PK
5152 PK/BK
1792 BARE
UE1
W7 Blunt Cut - Shield
UI8+UE1
W7 Blunt Cut - Shield
UE1
UE1
UI8+UE1
UI8+UE1
X1 1 13 7 4 5
X2 7 15
X1 4 5
B+
A11 Radio
X1 8
X6 BK
USR
USB
BK
X92 USB Receptacle
351 BK/WH
G302
X1 2 9 3 10
1857 D-BU
1957 L-BU
1853 OG
1953 D-GN
9
X318 D1 D2 A1 A2
1857 D-BU
1957 L-BU
1853 OG
1953 D-GN
9
X500 B12 C12
X600 A1 B1
1857 D-BU
1957 L-BU
1853 OG
1953 D-GN
9
B
P19AG Speaker - Left Front Door
A
B
P19AH Speaker - Right Front Door
A
L O C
D E S C

Antennas

LOC
DESC

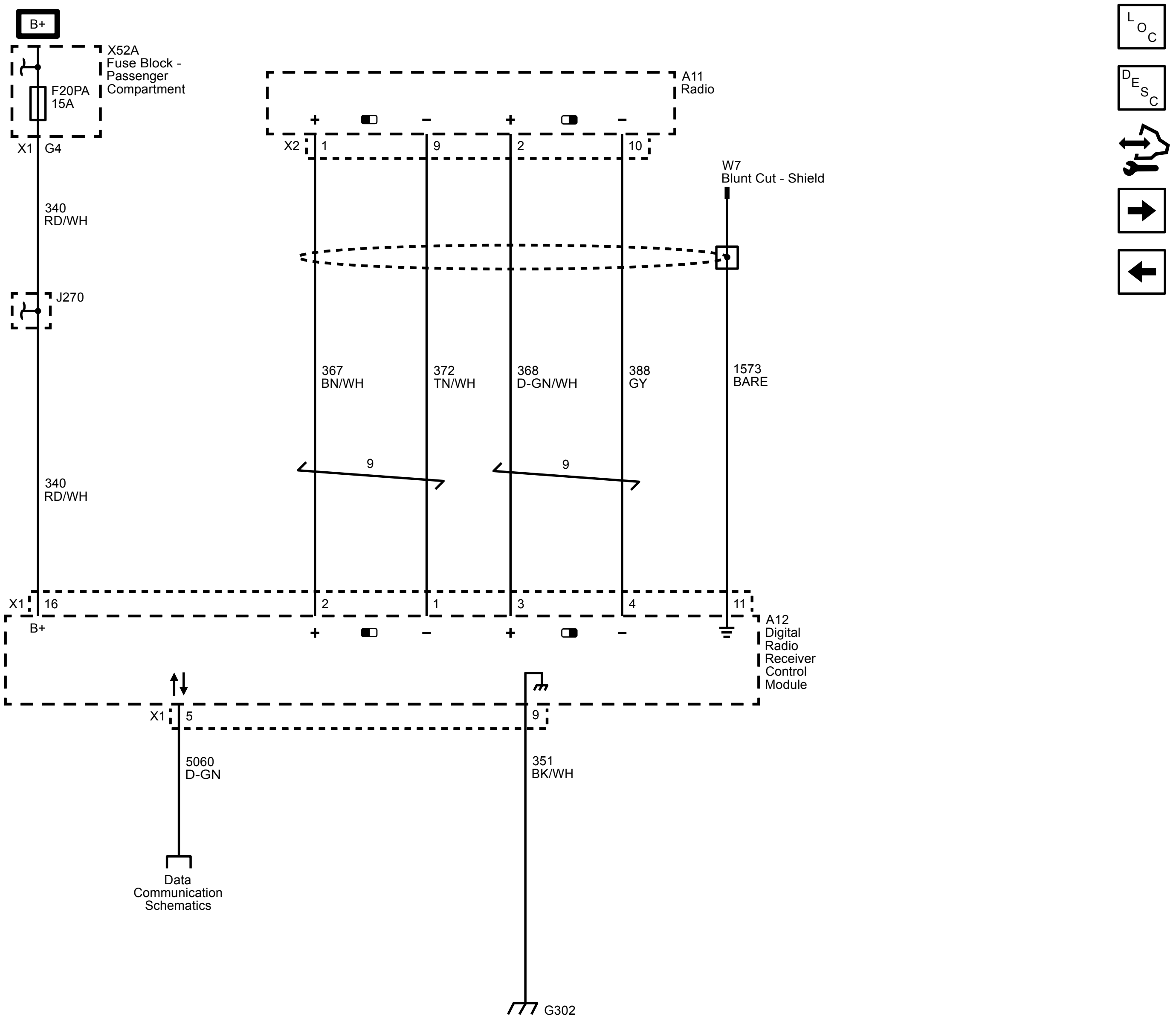

AM/FM
T4M Radio Antenna
XM
GPS/CELL
T4G Cellular Phone, Navigation, and Digital Radio Antenna
X1
X2
UI8/UE1
COAX
U73
U2K/UBS
UI8-UE1
UI8+UE1
UE1-UI8
COAX
COAX
COAX
COAX
COAX
X1 GY
GPS/CELL
T15 Navigation Antenna Signal Splitter
GPS
GPS/CELL
X2 BU
X3 PK
COAX
COAX
X2
A12 Digital Radio Receiver Control Module
XM
COAX
COAX
T4S Wireless Communication Antenna - Bluetooth
X3 BK
X4
A11 Radio
AM/FM
GPS
X4
K73 Telematics Communication Interface Control Module
GPS/CELL
Bluetooth

Rear Speaker Outputs



A11 Radio
+
−
+
−
X2
5
13
6
14
1859 TN
1959 WH
1855 TN
1955 OG
9
X318
C3
C4
B3
B4
CARGO/ PASSENGER
CUTAWAY +YF1
W22 Blunt Cut - Rear Speaker Provision
J453
J451
J452
J450
YF2/YF7
X320
A
B
C
D
X415
X411
X400
US8
P19LR Speaker - Left Rear Roof
P19F Speaker - Left Rear Cargo Door
P19RR Speaker - Right Rear Roof
P19T Speaker - Right Rear Cargo Door

Digital Radio Receiver (U2K or UBS)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X52A
Fuse Block - Passenger Compartment
F20PA
15A
X1
G4
340
RD/WH
J270
340
RD/WH
A11
Radio
X2
1
9
2
10
W7
Blunt Cut - Shield
367
BN/WH
372
TN/WH
368
D-GN/WH
388
GY
1573
BARE
9
9
X1
16
2
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3
4
11
B+
A12
Digital Radio Receiver Control Module
X1
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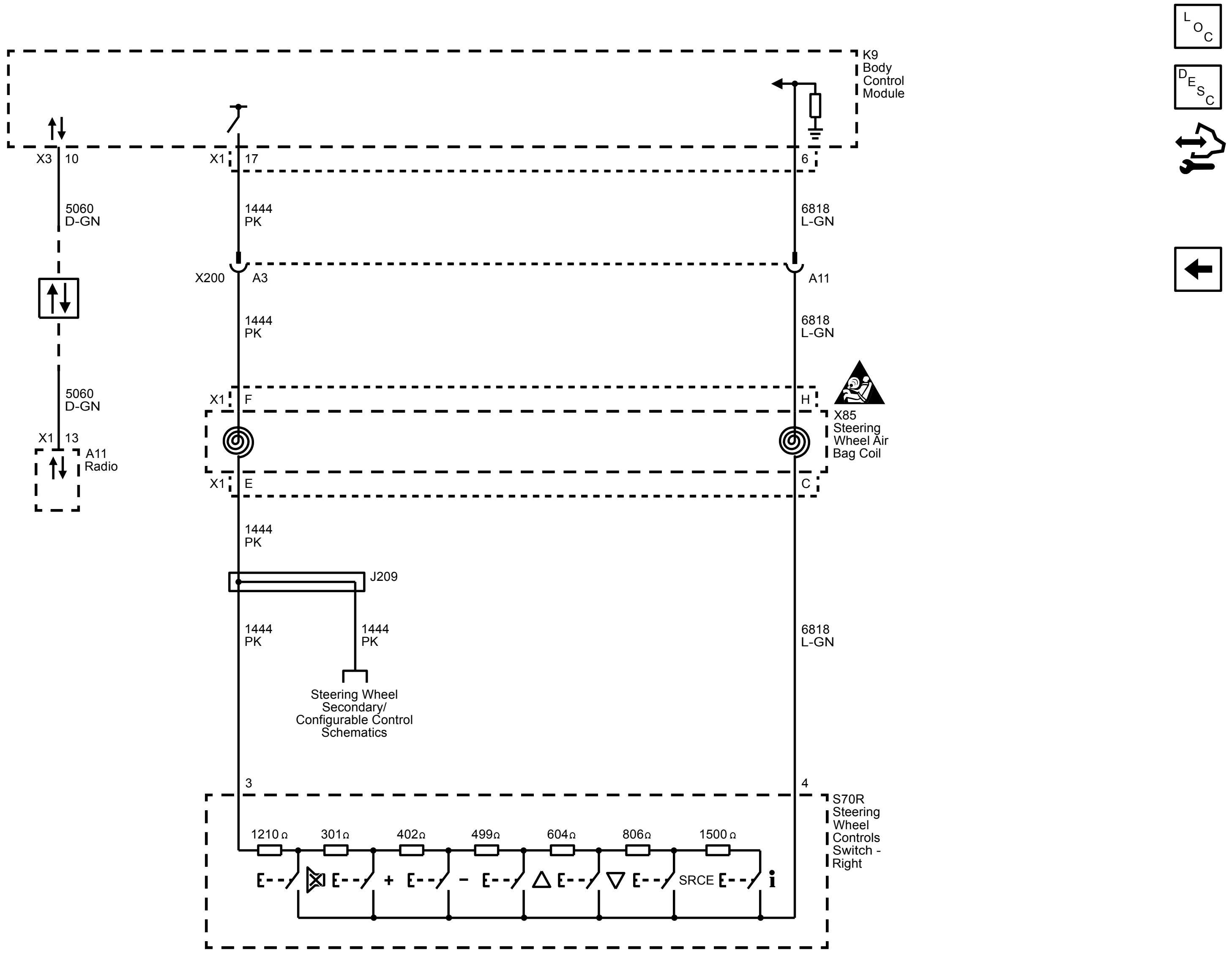
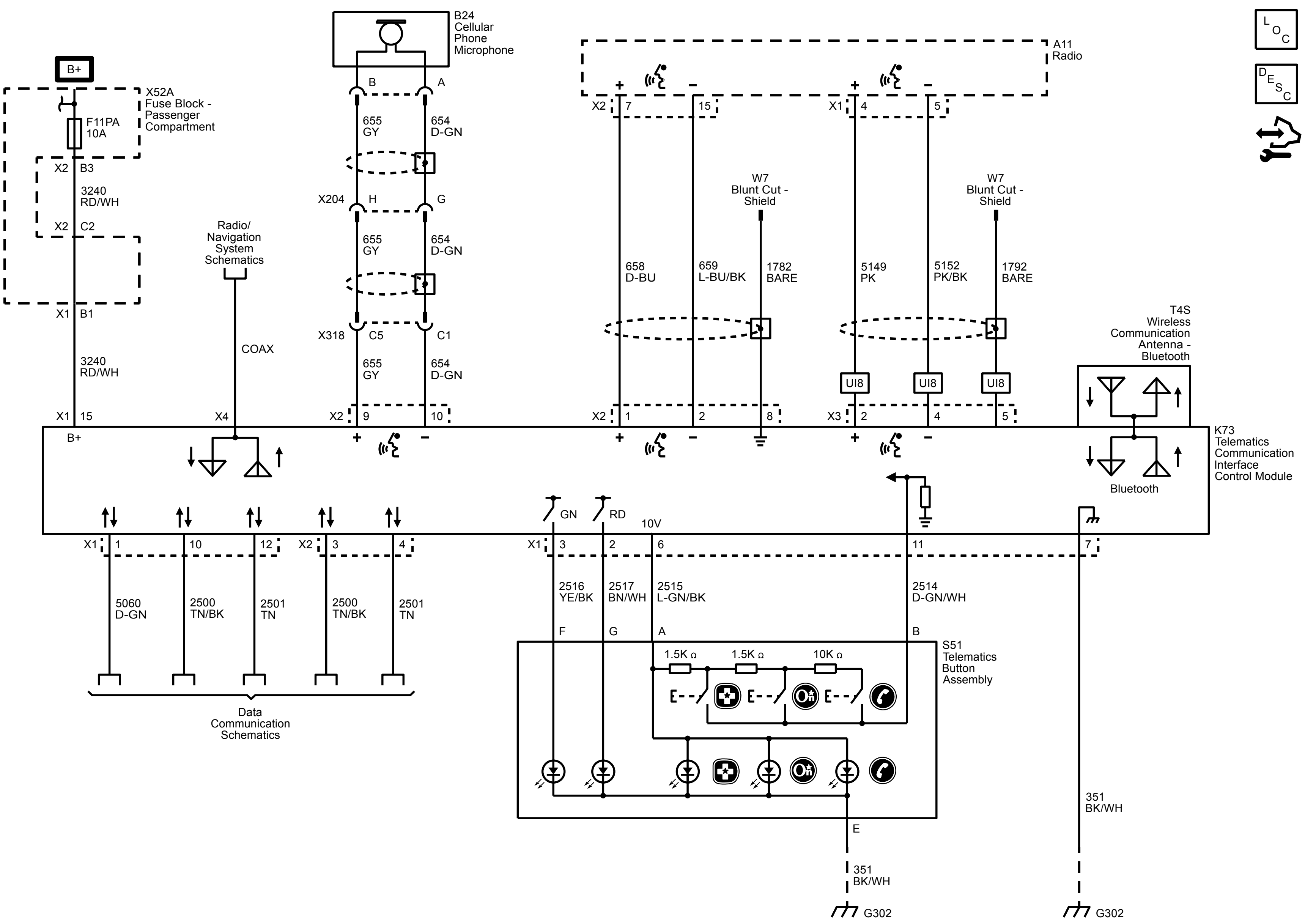
D-GN
Data Communication Schematics
351
BK/WH
G302
LOC
DESC

Steering Wheel Radio Redundant Controls


K9
Body
Control
Module
X3
10
X1
17
6
5060
D-GN
1444
PK
6818
L-GN
X200
A3
A11
1444
PK
6818
L-GN
5060
D-GN
X1
F
H
X85
Steering
Wheel Air
Bag Coil
X1
13
A11
Radio
X1
E
C
1444
PK
J209
1444
PK
1444
PK
6818
L-GN
Steering Wheel
Secondary/
Configurable Control
Schematics
3
4
S70R
Steering
Wheel
Controls
Switch -
Right
1210 Ω
301 Ω
402 Ω
499 Ω
604 Ω
806 Ω
1500 Ω
+
-
SRCE
i

OnStar Module (UE1)


B+
X52A
Fuse Block -
Passenger
Compartment
F11PA
10A
X2 B3
3240
RD/WH
X2 C2
X1 B1
3240
RD/WH
X1 15
B+
Radio/
Navigation
System
Schematics
COAX
X4
B24
Cellular
Phone
Microphone
B A
655 GY
654 D-GN
X204 H G
655 GY
654 D-GN
X318 C5 C1
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654 D-GN
X2 9 10
A11
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X2 7 15
X1 4 5
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5152 PK/BK
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UI8
X2 1 2 8
X3 2 4 5
T4S
Wireless
Communication
Antenna -
Bluetooth
K73
Telematics
Communication
Interface
Control Module
Bluetooth
GN
RD
10V
X1 1 10 12
X2 3 4
X1 3 2 6 11 7
5060 D-GN
2500 TN/BK
2501 TN
2500 TN/BK
2501 TN
Data
Communication
Schematics
2516 YE/BK
2517 BN/WH
2515 L-GN/BK
2514 D-GN/WH
F G A B
S51
Telematics
Button
Assembly
1.5K Ω
1.5K Ω
10K Ω
E
351 BK/WH
G302
351 BK/WH
G302
L O C
D E S C

Description and Operation

Navigation System Description and Operation

Each item in the list below represents topics covered in detail below.

- Audio System Description
- Navigation System Components
- Navigation Radio
- Global Positioning System (GPS) Antenna
- Route Guidance
- Auxiliary RCA Video Jacks (If Equipped)
- Map Data
- Voice Recognition
- Points of Interest

Audio System Description

The Navigation radio operates similar to a traditional radio. For information on the audio description and operation, refer to Radio/Audio System Description and Operation.

Navigation System Components

The navigation system contains the following components:

- Navigation Radio
- GPS Antenna
- Auxiliary RCA Video Jacks (If Equipped)
- Map Data

Navigation Radio

This component acts as the operator interface for the navigation system, provides the data input from the operator to the navigation system and provides navigation information to the operator via the display screen. The navigation radio is located in the center of the instrument panel. The navigation radio provides the following:

- A display screen—All navigation, audio and TV functions are displayed on this screen.
- Soft key buttons on the display to allow selection from menus and to operate the navigation system and the audio system
- The navigation system map with routing information displayed on the navigation radio screen
- Provides verbal guidance to the operator
- Connection to the GPS antenna, which provides the vehicle position information

Global Positioning System (GPS) Antenna

The GPS antenna is located in the upper center of the I/P. The GPS antenna is powered through the same coaxial cable used to send the signals to the NAV radio. Interference to the system may occur if any of the following exist:

- Signals are obstructed by objects such as, tall buildings or trees.
- Metallic objects located on the dashboard
- Aftermarket glass tinting has been applied to the vehicles windshield.

Route Guidance

The map will display the route to the selected destination. Voice prompts alert the operator of upcoming events, turns and arrivals at the destination. The navigation system will automatically recalculate if the route is not followed. The navigation radio uses data received from the GPS satellites as well as the vehicle speed signal to accurately display the current position of the vehicle. The map data must be in the NAV radio for route guidance.

Auxiliary RCA Video Jacks (If Equipped)

The auxiliary RCA video jacks are used to attach a remote video device. These connections may be used to provide audio and video input from a remote device such as a video game console or camera to the rear seat entertainment system.

Map Data

This component provides the map information for navigation and route guidance. This data is stored on different media formats depending on the navigation radio. The possible formats are:

- DVD/CD
- HDD (Hard Drive)

- SD Card
- Compact Flash

Voice Recognition

The Navigation System voice recognition allows for hands-free operation of navigation and audio system features. The voice recognition can be used when the ignition is in accessory or ON, or when retained accessory power (RAP) is active. This feature only works if the map data is in place and the AGREE button has been pressed. For a complete list of available commands, refer to the Owners Manual Navigation Supplement and/or Personalization in the Owners manual.

Points of Interest

Points of interests (POI) are locations that are frequently visited. Points of interest can be can be displayed on the map or set as a destination. The following are some of the available POI:

- Gas Station
- Restaurant
- College
- Police Station

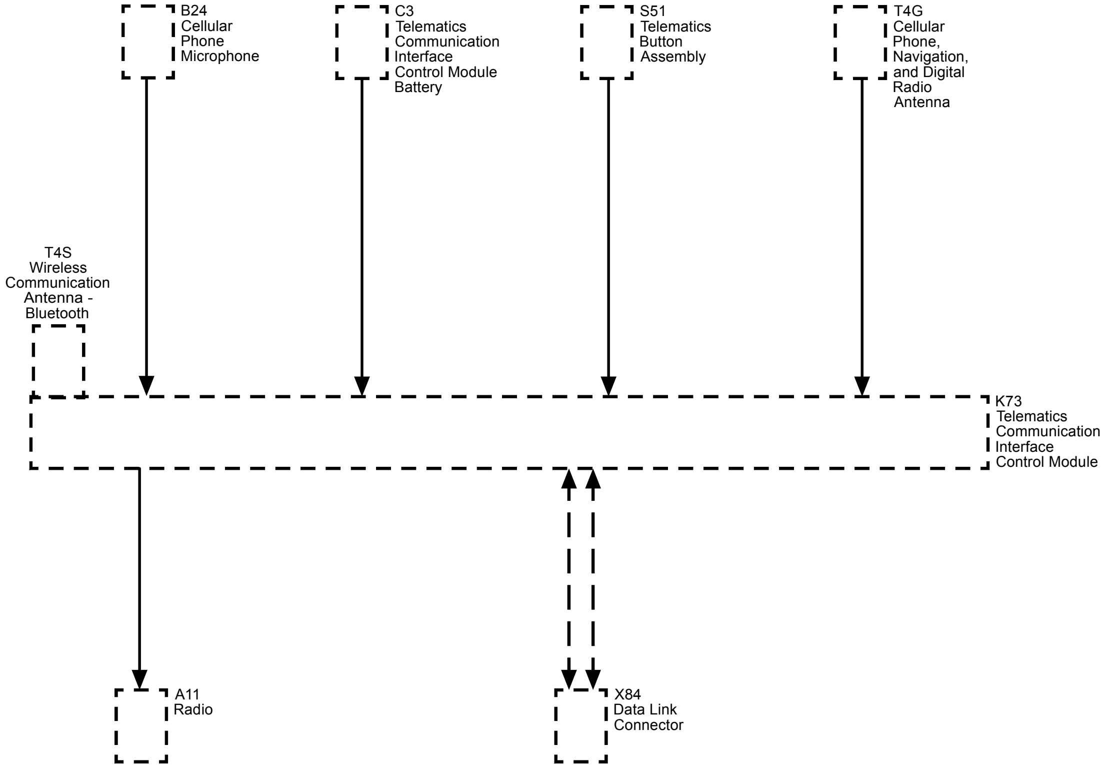
OnStar Description and Operation

This OnStar® system consists of the following components:

- Telematics communication interface control module
- OnStar® three button assembly
- Microphone
- Cellular antenna
- Navigation antenna
- Bluetooth® antenna (If equipped)
- Back up battery (If equipped)
- WiFi Hotspot (If equipped)
- TTY (Teletypewriter)

This system also interfaces with the factory installed vehicle audio system.

Onstar Block Diagram


B24
Cellular
Phone
Microphone
C3
Telematics
Communication
Interface
Control Module
Battery
S51
Telematics
Button
Assembly
T4G
Cellular
Phone,
Navigation,
and Digital
Radio
Antenna
T4S
Wireless
Communication
Antenna -
Bluetooth
K73
Telematics
Communication
Interface
Control Module
A11
Radio
X84
Data Link
Connector

Telematics Communication Interface Control Module

The OnStar Generation 10 system uses Global System for Mobile Communication (GSM) to communicate data and voice signals over the national cellular network. The module may also have the ability to act as a Wireless Local Area Network (WLAN) Wi-Fi hotspot similar to a home wireless router. The module houses an internal WLAN antenna enabling hotspot connectivity and streaming high speed media to the entertainment system. The module also may enable Teletypewriter (TTY) and be capable of Bluetooth communication utilizing an internal antenna. The module is capable of up to 4G LTE speeds and houses 2 technology systems, one to process Global Positioning System (GPS) data, and another for cellular information. The module sends and receives all cellular communications over two cellular antennas and cellular antenna coax cables.

The OnStar Gen 10 system has two antenna inputs, a primary cellular signal and a combined GPS/secondary cellular signal. The OnStar® system uses the Unitied States Global Positioning System (GPS) signals to provide location on demand. GPS is a space-based satellite navigation system that provides location and time information in all weather conditions, anywhere on or near Earth where there is an unobstructed line of sight to four or more GPS satellites.

The module also has the capability of activating certain features such as, the horn, remote engine starting, initiating door lock/unlock, or activating the exterior lamps using the serial data circuits. These functions can be commanded by the OnStar® Call Center per a customer request or mobile device app depending on vehicle and customer subscription.

Dedicated circuits are used to connect the telematics communication interface control module to a microphone, the button assembly, radio, and if equipped the Back Up Battery (BUB). The telematics communication interface control module communicates with the rest of the vehicle over the serial data bus.

Power is provided by a dedicated, fused B+ circuit. Ground is provided through the vehicle wiring harness attached to the module. The power mode state is determined by the telematics communication interface control module through serial data messaging.

OnStar® Three Button Assembly

- The OnStar® button assembly may be part of the rearview mirror, or a separate, stand alone unit. The button assembly is comprised of 3 buttons or 3 capacitive touch buttons and status LED’s or an error indicator. The buttons are defined as follows:
  - The answer/end button, which is black with a white phone icon or a white driver figure seated with voice signals near its face, allows the user to answer and end calls or initiate speech recognition.
  - The blue OnStar® call center button, which displays the OnStar® logo, allows the user to connect to the OnStar® call center.
  - The emergency button, which displays white letters “SOS” with red background, sends a high priority emergency call to the OnStar® call center when pressed.

If the LED does not illuminate, this may indicate that the customers OnStar® subscription is not active or has expired. Push the blue OnStar button to connect to an advisor who can then verify the account status.

The telematics communication interface control module supplies 10 volts to the OnStar® button assembly on the keypad supply voltage circuit. When pressed, each button completes a circuit across a resistor allowing a specific voltage to be returned to the telematics communication interface control module on the keypad signal circuit. Depending upon the voltage range returned the telematics communication interface control module is able to identify which button has been pressed.

The OnStar® status LED or error indicator is located near the buttons. The LED is green when the system is ON and operating normally. When any indicator is illuminated and flashing, it is an indication that a call is in progress. When the LED is red, this indicates a system malfunction is present. In the event there is a system malfunction and the OnStar® system is still able to make a call, the LED will flash red during the call.

Each LED or error indicator is controlled by either the telematics communication interface control module over dedicated LED signal circuits or by low speed GM LAN serial data depending on the inside rearview mirror option. Ground for the LED is provided by the wiring harness attached to the button assembly.

Secondary OnStar® Controls

Some vehicles may have an additional button that when pushed can engage the OnStar® system. The button may be a symbol of a face with sound waves, or may say MUTE, or be a symbol of a radio speaker with a slash through it.

By engaging the OnStar® system with this feature, the user can interact with the system by use of voice commands. A complete list of these commands is supplied in the information provided to the customer. If the information is not available for reference, at any command prompt the user can say "HELP" and the telematics communication interface control module will return an audible list of available commands.

OnStar® Microphone

The cellular microphone can be part of the rearview mirror assembly, or a stand-alone unit in the headliner or roof console. In either case, the telematics communication interface control module supplies approximately 10V to the microphone on the cellular microphone signal circuit. The microphone modifies the 10V depending on the volume and voice being detected. A cellular microphone low reference circuit or a drain wire provides a ground for the microphone. The microphone signal circuits pass through the telematics communication interface control module to support entertainment voice recognition.

Cellular and GPS Antennas

The combination antenna will have any of the following antenna elements when equipped with OnStar:

- Primary cellular element
- Secondary cellular element
- GPS element
- Digital radio element
- AM/FM element

The Gen 10 OnStar® system uses 2 cellular antenna elements to send and receive cellular data, the primary cellular element and the secondary cellular element. The primary cellular signal is carried by a coax cable that connects the antenna directly to the telematics communication interface control module. Details of the secondary cellular signal are further described below.

The GPS antenna element is used to collect the signals of the orbiting GPS satellites. Within the antenna is housed a low noise amplifier that allows for a more broad and precise reception of this data. Also housed within the antenna is circuitry to combine the GPS signal and the secondary cellular signal. Without navigation, the combination GPS/secondary cellular signal is carried by a coax cable that connects directly to the telematics communication interface control module. The cable also provides a path for DC current for powering the antenna. With navigation, the combination GPS/secondary cellular signal is carried by a coax cable that connects to the navigation signal splitter. The splitter supplies the GPS signal to the navigation/entertainment system and the GPS/cellular signal to the telematics communication interface control module.

The digital radio element collects digital radio signals from two satellites and where necessary terrestrial repeaters. The digital radio signal is carried by a coax cable and connected to the digital radio receiver. Refer to Radio/Audio System Description and Operation for further details.

The radio signal is sent from a broadcast station and is then received by the AM/FM radio antenna element. The AM/FM radio signal is carried by a coax cable and is connected to the radio. Refer to Radio/Audio System Description and Operation for further details.

OnStar® RemoteLink

OnStar® RemoteLink is a mobile app to link mobile devices to a vehicle for limited diagnostics and feature controls. After downloading the app and registering the device, vehicle owners with an eligible vehicle can use their mobile devices to access real-time data from their vehicle and perform specific commands remotely.

All communication between the app and the vehicle is powered by OnStar's® advanced connected vehicle technology. An active OnStar® account as well as a valid OnStar® username and password are required to use the app. The remote commands must be enabled by logging into the user’s OnStar® account prior to using the app. Refer to the owners manual for available vehicle data and control features.

Compass Heading

The telematics communication interface module has a compass feature to calculate vehicle direction which is displayed via the instrument panel cluster or designated display. The compass heading is determined by dead reckoning until the GPS 3d fix is established. The dead reckoning is accomplished by using the yaw rate sensors and wheel ticks to determine heading changes from a GPS known heading. The GPS 3d fix heading is determined by the deferential of two locations. If “CAL” is displayed on the Instrument Panel Cluster or designated display refer to the owners manual for steps to calibrate the compass.

Bluetooth® (If Equipped)

Bluetooth® wireless technology is a short-range communications technology intended to replace the cables connecting portable and/or fixed devices while maintaining high levels of security. Only vehicles with steering wheel controls will have Bluetooth® functionality. In order to utilize the vehicle’s Bluetooth® system, a Bluetooth® equipped cellular phone is required.

The Bluetooth® antenna is internal to the telematics communication interface control module, radio or human machine interface module and is used to send and receive signals from a Bluetooth® enabled cellular phone. The available features and functions are determined by the software within the device being used and the telematics communication interface control module. The operating range of the signal from the vehicle is approximately 30 feet. Note that the operating range is dependent upon the cellular phone being used and battery level of the phone.

With Bluetooth® technology customers can experience hands-free calling as their Bluetooth® capable cellular phones are wirelessly connected to the vehicle. It will allow customers to place and receive calls using the steering wheel controls and voice recognition. The vehicle audio system will allow you to listen to your call through the vehicle speakers and adjust volume through steering wheel or radio controls.

Not all Bluetooth® cellular phones are guaranteed to work with the vehicle’s Bluetooth® system. Based on the cellular phone’s service provider and the manufacturer’s implementation of Bluetooth®, not all phones support all available Bluetooth® functionality. Bluetooth® enabled cellular phones will be tested for vehicle compatibility and a feature compatibility list will be provided via the GM Bluetooth® website: http://www.gm.com/vc/bluetooth/

Bluetooth® Features Supported

The following is a list of features supported by the Bluetooth® system. Note that not all devices will support all of the listed functions.

- Automatic reconnection – highest priority phone will automatically be connected to vehicle when vehicle ignition is on
- Hands-free dialing- via digits, redial, name tags (phone number saved to a nametag via voice recognition)
- Answering a call
- Ending a call
- Mute a Call
- Rejecting a call – ignore an incoming call
- Call Waiting
- Three-way Calling – initiated from hands-free system
- Send Number During a Call – this is used when calling a menu-driven phone system
- Transfer a Call – transfer call from vehicle to cellular phone and visa versa
- Voice Pass-Thru – allow access to the voice recognition commands on the cellular phone

Pairing a Bluetooth® Cellular Phone to the Vehicle

In order to use hands-free calling, the cellular phone must be paired to the vehicle. Up to five devices can be paired to the vehicle at one time, but only one can be connected at any given time. To pair a phone, the customer must know how to operate the Bluetooth® functionality of their phone. The pairing process must only be done one time for each phone, unless that phone’s information is deleted. The system will always generate a password and will provide that password if the device you are pairing does not support Secure Simple Pairing (SSP). If the device being paired does support SSP the system will not provide the password and automatically pair the device. For safety reasons, the pairing process is disabled while the vehicle is moving.

Once the Bluetooth® cellular phone has been paired with vehicle, it will automatically connect to the vehicle when the ignition is on and the device is on. When more than one paired phone is in the vehicle, the phone with the highest priority will be connected. If the cellular phone is in use while getting into the vehicle, the phone can be switched to hands-free mode with the press of a button. In addition, a call in progress can be transferred from the vehicle hands-free mode to the phone to continue the call as the customer exits the vehicle.

Complete pairing instructions are provided in the Vehicle Owners Manual.

Back-up Battery (If Equipped)

Note: Do not disconnect the main vehicle battery or remove the OnStar® fuse with the ignition key in any position other than OFF. Disconnecting power to the OnStar® module in any way while the ignition is ON or with retained accessory power activated may cause activation of the OnStar® Back-Up Battery. This action is per design as the back-up battery is designed to provide power to the telematics communication interface control module so an emergency notification call can be made after an event where the main battery is disabled. Once the Back-Up Battery is activated it will stay on until the power is restored back to the telematics communication interface control module. The telematics communication interface control module naturally chooses the main supply voltage as it’s default supply, but if the main supply is removed or lost for any reason the OnStar® module will use the Back-Up Battery as a power supply as long as the default supply can not be detected. The back-up battery is not rechargeable and once discharged below 9.5 volts the back-up battery must be replaced.

Certain OnStar® equipped vehicles may also be equipped with a back-up battery. The back-up battery is a non-rechargeable, lithium battery intended to provide an auxiliary power source for the telematics communication interface control module in the event where power from the main vehicle battery is lost.

The back-up battery is intended to have a limited life span of approximately 4 years and is designed to maintain an open circuit voltage between 16 V and 9 V throughout this period. This allows the battery to power the basic functions of the telematics communication interface control module for least one 200 second (5 minute) call at the end of the 4 year span, should the main vehicle battery be lost. In the case of a vehicle losing vehicle battery power, OnStar will switch over to the backup battery based on an internal algorithm. It will look for an air-bag deploy, or near-deploy, messages from the SDM. If there are no messages the OnStar module will stay wake for a few minutes longer and monitor the buttons in the mirror. If not pressed, the modules will power down and shut off completely.

The back-up battery is connected to the telematics communication interface control module through the back-up battery positive voltage circuit and back-up battery ground circuit and is protected from a short circuit by means of an internal fuse. In the event the back-up battery, battery positive voltage circuit is shorted to the back-up battery ground circuit or chassis ground, the fuse will open and render the back-up battery permanently inoperable. The status of the back-up battery and its associated wiring is monitored by the telematics communication interface control module.

WiFi Hotspot

The telematics communication interface control module acts as a Wireless Local Area Network (WLAN) WiFi hotspot router and uses direct 4G LTE connectivity to the internet. It has the ability to connect up to 7 devices at one time. A data plan is required and when purchased, a security default password is established. There are several ways to change the SSID or password, by placing a call to the OnStar Call Center, by using the Gen 10 mobile app or through the scan tool.

The system utilizes a secure autoconnect feature between the telematics communication interface control module and the radio/HMI. No user interaction is required, it is always available and ready to connect to a dedicated in car device. The ignition must be in Run, Accessory or RAP for WiFi to operate.

Audio System Interface

When the OnStar® requires audio output, a serial data message is sent to the audio system to mute all radio functions and transmit OnStar® originated audio. The OnStar® audio is transmitted to the vehicle audio system by a dedicated signal circuit and a low reference circuit.

The audio system will mute and an audible ring will be heard though the speakers if the vehicle receives a call with the radio ON.

On some vehicles, the HVAC blower speed may be reduced when the OnStar® system is active to aid in reducing interior noise. When the system is no longer active, the blower speed will return to its previous setting.

OnStar® Sleep Cycle

The OnStar® system uses a unique sleep cycle to allow the system to receive cellular calls while the ignition is in the OFF position and retained accessory power mode has ended. This cycle enables the telematics communication interface control module to perform remote functions, such as door unlock, as commanded over the air by the OnStar® Call Center, and to continue to maintain an acceptable level of battery electrical drain.

The OnStar® system uses 4 states of readiness, depending upon the type of cellular market the vehicle is in when the ignition is put into the OFF state:

- High power
- Low power
- Sleep
- Digital standby

The high power state is in effect whenever the ignition is in the ON or RUN position, or retained accessory power is enabled, and the OnStar® system is sending or receiving calls or when the system is performing a remote function.

The low power state is in effect when the OnStar® system is idle with the ignition in the ON or RUN position, or with retained accessory power enabled.

The sleep state is entered after the vehicle has been shut off and the retained accessory power has timed out while in an analog cellular area. At a predetermined time recorded within the telematics communication interface control module, the system re-enters the low power state to listen for a call from the OnStar® Call Center for 1 minute. After this interval, the system will again return to the sleep state for 9 minutes. If a call is sent during the 1 minute interval, the OnStar® system will receive the call and immediately go into the high power mode to perform any requested functions. If no call is received during the 1 minute interval, the system will go back into the sleep mode for another 9 minutes. This process will continue for up to 48 hours, after which the OnStar® system will turn off until the ignition is turned to the ON or RUN position.

The digital standby power state is entered after the vehicle has been shut off and the retained accessory power has timed out while in a digital cellular area. When in digital standby mode, the OnStar® module is able to perform all remote functions as commanded by an OnStar® advisor at any time, for a continuous 120 hours. After 120 hours, the OnStar® module will go into sleep mode until a wake up signal from the vehicle is seen by the telematics communication interface control module. If the OnStar module loses the digital cellular signal it will revert to analog mode and follow the standard sleep state (9 minutes OFF, 1 minute standby) based on the time of the GPS signals, this will continue until a digital cellular signal is again received.

If the OnStar® system loses battery power while the system is in a standby or sleep mode, the system will remain OFF until battery power is restored and the ignition is turned to the ON or RUN position.

Features

OnStar® Personal Calling

The hands free, OnStar® personal calling cellular phone feature is an additional feature of the OnStar® system. This feature is embedded within the telematics communication interface control module; however it must be activated by an OnStar® advisor. OnStar® personal calling operates similar to most hand held cellular phones in that the availability for its usage is based on minutes or units. The customer must have a current OnStar® subscription, as this feature cannot be utilized without it. To use OnStar® personal calling, the customer must also purchase units (minutes) as outlined in the owners guide provided with the OnStar® system. Units begin to deplete, 1 unit is equal to 1 minute, as the customer makes outbound phone calls, answers inbound phone calls, or while connected to the OnStar® virtual advisor. In addition, units may also have an expiration date, depending upon the type of units purchased.

Customers have the ability to store telephone numbers within the module, referenced by a nametag for the convenience of frequently dialed numbers. After storing a nametag, the user can dial this number by initiating the OnStar® personal calling feature, speaking the word "call," and repeating the nametag assigned.

Turn by Turn Navigation

Turn by Turn Navigation allows the driver to contact OnStar® to obtain directions for driving from a current location to a desired location. The Turn by Turn Navigation system stores your planned route and continually checks your position along that route, when you deviate from the planned route, the system will recognize this and prompt the driver with verbal prompts for how to proceed. The driver then responds verbally to direct the system to continue the current routing or to recalculate the route because of a missed turn.

Advisor Record Feature

The Advisor Record Feature allows the user to store any information given during a call with an OnStar® Advisor. Recording is activated by pressing the blue OnStar button during a call; pressing the button a second time stops the recording. The stored information can be played back by pressing the phone button on the three button assembly and using the voice command “Advisor Playback”.

Teletypewriter (TTY) Users

OnStar has the ability to communicate to deaf, hard-of-hearing, or speech-impaired customers while in the vehicle. The available dealer-installed TTY system can provide in-vehicle access to all of the OnStar services, except Virtual Advisor and OnStar Turn-by-Turn Navigation.

Deactivated OnStar® Accounts

In the event a customer has not renewed their OnStar® account after expiration or the account was never activated, OnStar® will make a discrete cellular call to the vehicle to deactivate the OnStar® system. Before taking this action, customers are notified that the OnStar® system in their vehicle will be deactivated unless they elect to renew the account. After the OnStar® account has been deactivated, customers will experience the following:

- The OnStar® status LED will not illuminate.
- The OnStar® system will NOT attempt to connect to the OnStar® Call Center in the event of a collision or if the vehicle's front air bags deploy for any other reason.
- An emergency button press will play a demo message indicating the service has been deactivated.
- An OnStar® Call Center button press will connect the customer with a dedicated sales team who can sell an OnStar® subscription and reactivate the vehicle. Depending on the type of OnStar® hardware in the vehicle, the customer may first hear a demonstration message stating there is no current OnStar® subscription for the vehicle, and directing the customer what to do to activate services.

- OnStar® personal calling will not be available, as this feature requires the customer to have a current OnStar® account. Attempts to use this feature may result in cellular connection failure messages and the inability to connect to the number dialed.

Certain vehicles that have never had an active OnStar® account, or that have been deactivated, may be unable to establish a connection with the OnStar® Call Center. When normal published diagnostic procedures do not indicate a possible cause for the no connect concern, the vehicle may have been deactivated. For deactivated vehicles, a no connect response should be considered normal operation. Further diagnosis and subsequent repair is only necessary should the customer elect to become an active OnStar® subscriber or renew the account subscription.

OnStar® Cellular, GPS, and Diagnostic Limitations

The proper operation of the OnStar® System is dependent on several elements outside the components integrated into the vehicle. These include the National Cellular Network Infrastructure, the cellular telephone carriers within the network, and the GPS.

The cellular operation of the OnStar® system may be inhibited by factors such as the users range from an analog or digital cellular tower, the state of the cellular carrier’s equipment, and the location where the call is placed. Making an OnStar® key press in areas that lack sufficient cellular coverage or have a temporary equipment failure will result in either the inability of a call to complete with a data transfer or the complete inability to connect to the OnStar® Call Center. The OnStar® system may also experience connection issues if the identification numbers for the module, station identification number, electronic serial number or manufacturers electronic ID, are not recognized by the cellular carriers local signal receiving towers.

The satellites that orbit earth providing the OnStar system with GPS data have almost no failures associated with them. In the event of a no GPS concern, the failure will likely lie with the inability of the system to gain GPS signals because of its location, i.e. in a parking structure, hardware failure, or being mistaken with an OnStar® call which has reached the Call Center without vehicle data.

During diagnostic testing of the OnStar® system, the technician should ensure the vehicle is located in an area that has a clear unobstructed view of the open sky, and preferably, an area where analog or digital cellular calls have been successfully placed. These areas can be found by successfully making an OnStar® keypress in a known good OnStar® equipped vehicle and confirming success with the OnStar® Call Center advisor. Such places can be used as a permanent reference for future OnStar® testing.

Mobile Identification Number and Mobile Directory Number

The telematics communication interface control module utilizes 2 numbers for cellular device identification, call routing and connection, a mobile identification number and a mobile directory number. The mobile identification number represents the number used by the cellular carrier for call routing purposes while the mobile directory number represents the number dialed to reach the cellular device.

Operation of the OnStar® Speech Recognition Systems

OnStar® users communicate with 2 speech recognition systems. Speech recognition allows the user to speak to one computer in the vehicle, and one reached over a phone line. The computer tries to understand the users command, and responds by speaking back, or by taking the appropriate action, e.g. dialing the phone.

- Personal Calling uses a speech recognition system that resides in the vehicle. When the user presses the phone button, the system states, Ready, and listens for the user's command. The user can speak commands to control the hands-free phone.
- Virtual advisor is a remote speech recognition system that the caller can access by making a phone call. The user connects to virtual advisor by requesting it during personal calling use. The user is then transferred to the virtual advisor server and talks to it via a cellular connection.

The OnStar® speech recognition systems use speech technology that is designed to understand a wide range of American English speakers. Although there is no one right way to speak English, the system will work best when users try to modify their pronunciation should they encounter difficulty. Users who do not obtain good results are advised to try the tips and workarounds found in the Infotainment System Manual or the Owners Manual.

Radio/Audio System Description and Operation

The entertainment system on this vehicle may have several different configurations available to it. To determine the specific configuration of the vehicle, please see the Service Parts ID Label, and refer to RPO Code List.

The entertainment system on this vehicle is configured with either a base or an uplevel system. The base and uplevel systems each contain a radio, antenna, speakers, and on some systems an audio amplifier. The uplevel system differs from the base system by providing the customer with enhanced audio system features. Some of those features may include the radio data system (RDS), an audio amplifier, programmable equalizer (EQ), and digital satellite radio (U2K).

Each item in the list below represents topics covered in detail below.

- Radio Circuit Operation
- Antenna System
- AM/FM Reception
- Speaker Operation
- Radio Data System (RDS)
- Radio Data System (RDS) Messages
- MP3/CD Formatting Information for MP3/CD Radios (If equipped)
- Integral Multi Disc CD Changer (IMDX)
- Radio Error Messages
- Theft Deterrent
- Steering Wheel Controls
- Auxiliary Input Jack
- Speed Compensated Volume (SCV)

Radio Circuit Operation

Radio Power

The radio is supplied power by a fused B+ circuit. The radio does not use a discrete ignition feed circuit for power moding. The power mode master (PMM) provides the system power mode to the radio via serial data messages. The PMM determines the system power mode by processing power mode information from ignition switch inputs. Serial data power modes supported by the radio are OFF, ACCESSORY, RUN, and CRANK REQUEST.

Radio Grounds

The vehicle harness provides a ground for the radio circuits. The radio may also be case grounded.

Radio Data Link Communication

The radio communicates with other modules via serial data.

Radio Outputs

At minimum volume, the plus (+) and minus (-) speaker outputs are approximately half battery voltage, measured to vehicle ground. As the volume increases, the plus and minus change to create a voltage difference between each other either driving the voice coil of the speaker, or being fed to an amplifier.

Radio Head Dimming

Dimming and backlighting levels are determined by the serial data messages the radio receives.

Antenna System

Fixed Mast Antenna

The fixed mast antenna can withstand most car washes without being damaged. If the mast should ever become slightly bent, straighten it out by hand. If the mast is badly bent, replace it.

Check occasionally to make sure the mast is still tightened to its base. If tightening is required, tighten by hand, then with a wrench one quarter turn.

AM/FM Reception

Radio Signal

The radio signal is sent from a broadcast station and is then received by an antenna. The strength of the signal received depends on the following:

- The power output (wattage) of the broadcasting station
- The location of the vehicle (or receiver) relative to the broadcast tower.
- Obstacles between the tower and the receiver
- Atmospheric conditions
- What band (AM or FM) the station is broadcasting
- Type of antenna and the ground plane

AM Reception

The AM band has a lower frequency range than the FM band. These longer wavelengths:

- Bend around Obstacles
- Follow the curvature of the earth
- May reflect off the ionosphere (skip)

The AM frequencies have longer range due to the ground wave. The ground wave follows the curvature of the earth and is effected by its conductivity. Greater conductivity equates to less signal loss thus transmission over water is better than over land. The AM band has a range of 80–320 km (50–200 miles).

FM Reception

The shorter wavelengths of the higher frequency FM band:

- Reflect off obstacles
- Are absorbed by the ground
- Penetrate the ionosphere

Broadcasts in the FM band are limited to line of sight reception which is typically 40 km (25 miles). Even when out of a direct line of sight, the signal may be reflected into areas that would be in a shadow otherwise. Factors which affect the line of sight include:

- Height of the broadcast antenna
- Height of the receiving antenna
- Terrain and buildings in the broadcast path

Speaker Operation

Speakers turn electrical energy into mechanical energy to move air, using a permanent magnet and an electromagnet. The electromagnet is energized when the radio or amplifier (if equipped) delivers current to the voice coil on the speaker. The voice coil will form a north and south pole that will cause the voice coil and the speaker cone to move in relation to the permanent magnet. The current delivered to the speaker is rapidly changing alternating current (A/C). This causes the speaker cone to move in two directions producing sound. When the speaker is at rest, such as when the volume at a minimum value, the voltage applied to each side of the speaker is ½ ignition system voltage. This way, the speaker cone can be moved in either direction.

Radio Data System (RDS) (If equipped)

The radio may be equipped with the Radio Data System (RDS). The RDS feature is available only on FM stations that broadcast RDS information. This system relies upon receiving specific information from these stations and only works when the information is available. While the radio is tuned to an FM-RDS station, the station name or call letters display.

RDS data is carried in what is known as a "subcarrier". A subcarrier is a frequency that the FM broadcaster is authorized to use to send data that is not audible in the main audio program.

- RDS functions will only work with FM broadcast stations that are broadcasting RDS data.
- Not all FM Broadcast stations broadcast RDS data or offer all of the RDS services.
- The information displayed is dependent upon the information broadcast by the particular station. The information may vary greatly between stations.
- RDS functions may not work properly when reception is weak, reception is of poor quality, or RDS is not implemented properly by the FM Broadcaster.
- In some cases, a radio station broadcasting incorrect information may cause the RDS features of the radio to appear to work improperly.

With RDS, the radio can do the following:

- Seek to stations broadcasting the selected type of programming
- Receive announcements concerning local and national emergencies
- Display messages from radio stations

RDS may display text information such as:

- The name of the station.
- The type of program.
- General information such as artist and song title, call in phone numbers, etc.

RDS Messages

- ALERT!: Alert warns of local or national emergencies. When an alert announcement comes on the current radio station, ALERT! displays. You will hear the announcement, even if the volume is low or a CD is playing. If a CD is playing, play stops during the announcement. Alert announcements cannot be turned off. ALERT! is not affected by tests of the emergency broadcast system. This feature is not supported by all RDS stations.
- INFO (Information): If the current station has a message, the information symbol or INFO displays. Press this button to see the message. The message can display the artist, song title, call in phone numbers, etc. If the entire message can not be displayed, parts of the message appear every three seconds. To scroll through the message, press and release the INFO button. A new group of words displays after every press of this button. Once the complete message has displayed, the information symbol or INFO disappears from the display until another new message is received. The last message is displayed by pressing the INFO button. View the last message until a new message is received or you tune to a different station.

MP3/CD Formatting Information for MP3/CD Radios

The MP3/CD equipped radios will play standard audio CDs, and MP3/WMA files that were recorded on a CD-R or CD-RW disc. Customers who record their own music CDs should be aware of the following:

- The radio will only play audio from a CD-R/RW, it cannot record audio.
- Standard audio and MP3/WMA files should not be mixed on a disc.
- Song title, artist name, and album can display when files are recorded using ID3 tags version 1 and 2.
- Long file, folder, or playlist names, or a combination of a large number of files and folders, or playlists can cause the player to be unable to play up to the maximum number of files, folders, playlists, or sessions.
- The radio supports multi-session discs, but only the files from the last session will be played.

Integral Multi Disc CD Changer (IMDX) (If equipped)

The integral multi disc CD changer has the capability of storing and playing up to six (6) compact discs. The integral multi disc CD changer has a shock-absorbing system. Only under extreme operating temperatures or severe shock or vibration should the compact disc player skip or mute. If the customer travels an abnormally rough road, a skip condition may be normal. Test drive the vehicle on a normal road with a known good CD. If the condition is still present, replace the radio. The use of CD lens cleaner discs is not advised, due to the risk of contaminating the lens of the CD optics with lubricants internal to the CD mechanism.

The CD mechanism within the ICDX radio will begin an initialization routine after a battery connect (e.g., connecting radio connector X1). The initialization process takes approximately 25 seconds to complete. It is very critical that the initialization is completed before removing battery power from the radio, in order for the complex moving parts of the CD mechanism to be positioned properly before shipping and/or handling purposes. Damage may result to the moving parts of the CD mechanism if battery power is removed during the initialization routine. The damage occurs to the CD mechanism during subsequent shipping or handling operations. The extent of the damage causes the CD mechanism not to recover and the mechanism becomes inoperative.

Radio Error Messages

The Radio may display the following Error Messages (Not all messages may be applicable):

- ERR: This message is displayed when the radio is unable to play the inserted cassette or CD
- LOC: This message is displayed when the radio has entered Theft mode.
- CAL/CAL ERR: This message is displayed when the radio has detected an invalid calibration.
- CDX ERR: Displays if communication is lost with the remote CD changer.
- CHECK CD: Displays when the player encounters a focus or tracking error.
- CHK CDXX: Displays when the CD changer encounters a focus or tracking error .
- CHK TAPE: Displays if a tape has been inserted but is unable to be played due to an error.
- DOOR OPEN: Displays when the CD changer door has been left open.
- NO DISC: Displays when the radio expected a disc to be inserted.
- NONE: Displays when the radio is unable to detect the vehicle speed data information via the serial data circuit.

If an error message is displayed, perform the appropriate diagnostics.

Theft Deterrent

The radio theft deterrent system is intended to disable or limit radio functionality if incorrect vehicle information is received by the radio. The radio disables functionality if the VIN information received by the radio does not match the VIN information that has been learned by the radio. A VIN sequence is the last 6 digits of the VIN. The radio receives this information via serial data. A possible cause of incorrect VIN info could be the radio was originally installed in another vehicle.

The radio has the following theft operating modes as part of the theft deterrent system:

- Normal Mode--A radio has received a VIN sequence. The radio only learns the VIN sequence if the VIN sequence contained all 6 digits. In this mode the radio has full functionality.
- No VIN Mode--A radio that has not received or learned a VIN. In this mode the radio has limited functionality.
- Theft Detected Mode--A radio that had previously learned a VIN sequence and subsequently received a VIN sequence not matching the learned sequence. In this mode the radio has limited functionality.

Steering Wheel Controls (if equipped)

Some audio functions are available using the steering wheel controls. The steering wheel controls duplicate the function of the primary controls available on the radio.

For additional information on steering wheel controls, refer to Steering Wheel Controls Description and Operation.

Using the Auxiliary Input Jack (if equipped)

The radio system may have a 3.5 mm auxiliary input jack located on the faceplate. An external audio device such as an MP3 player, CD changer, laptop computer, cassette tape player, etc. can be connected to the auxiliary input jack for use as another source for audio listening. This is not an audio output; do not plug a headphone set into the front auxiliary input jack.

To use a portable audio player, connect a 3.5 mm (1/8 inch) cable to the radio's front auxiliary input jack. While a device is connected, press the radio CD/AUX button to begin playing audio from the device over the vehicle speakers. If there is a CD in the player, pressing the button once will play the CD, pressing again will switch it to the AUX feature.

Speed Compensated Volume (If equipped)

With Speed Compensated Volume (SCV), the audio system will adjust automatically to make up for road and wind noise as you drive, by increasing the volume as vehicle speed increases. To use SCV, set the volume at the desired level, and then select either Low, Medium, or High. To turn SCV off, select the Off screen button.

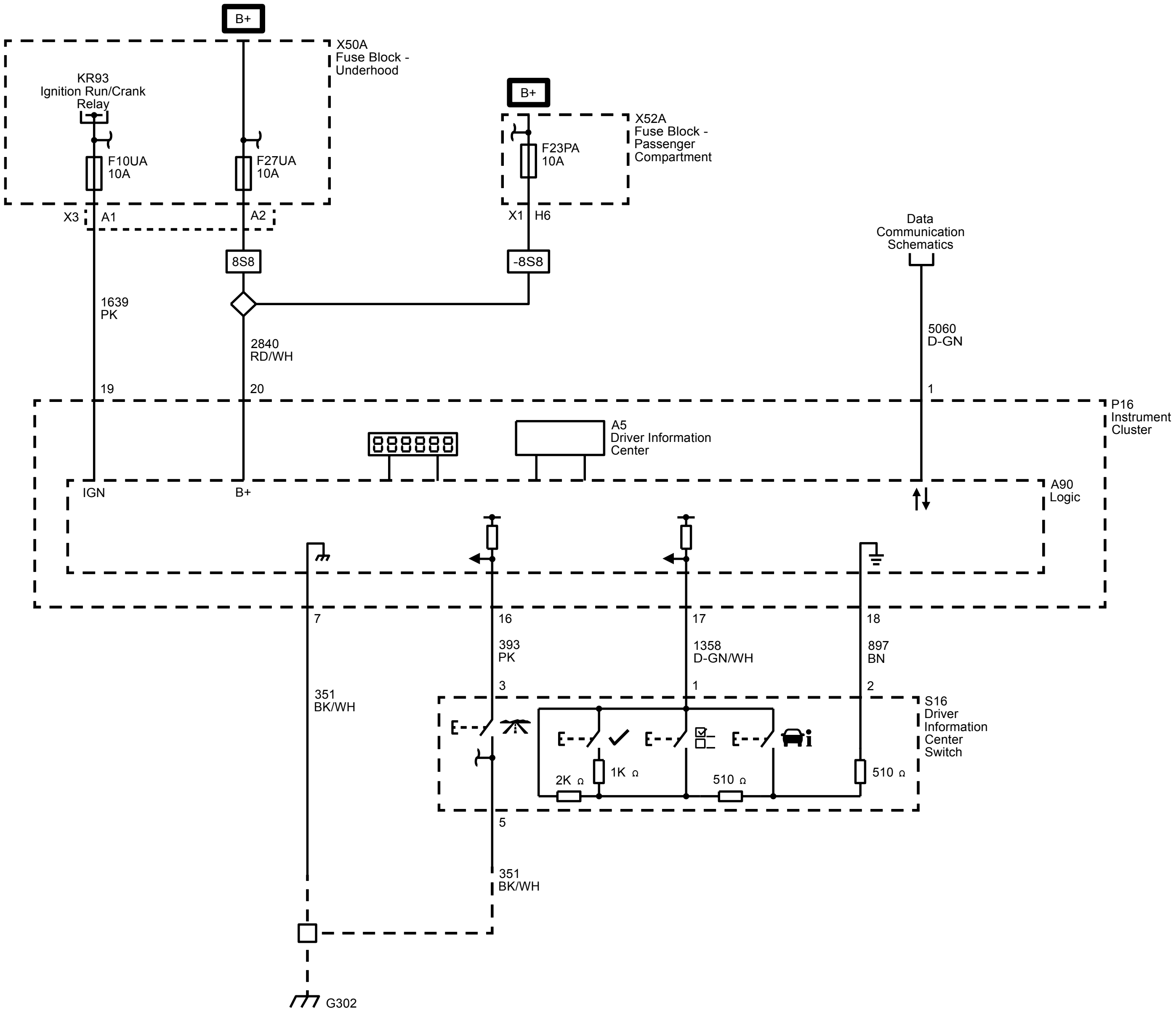
Driver Information and Entertainment

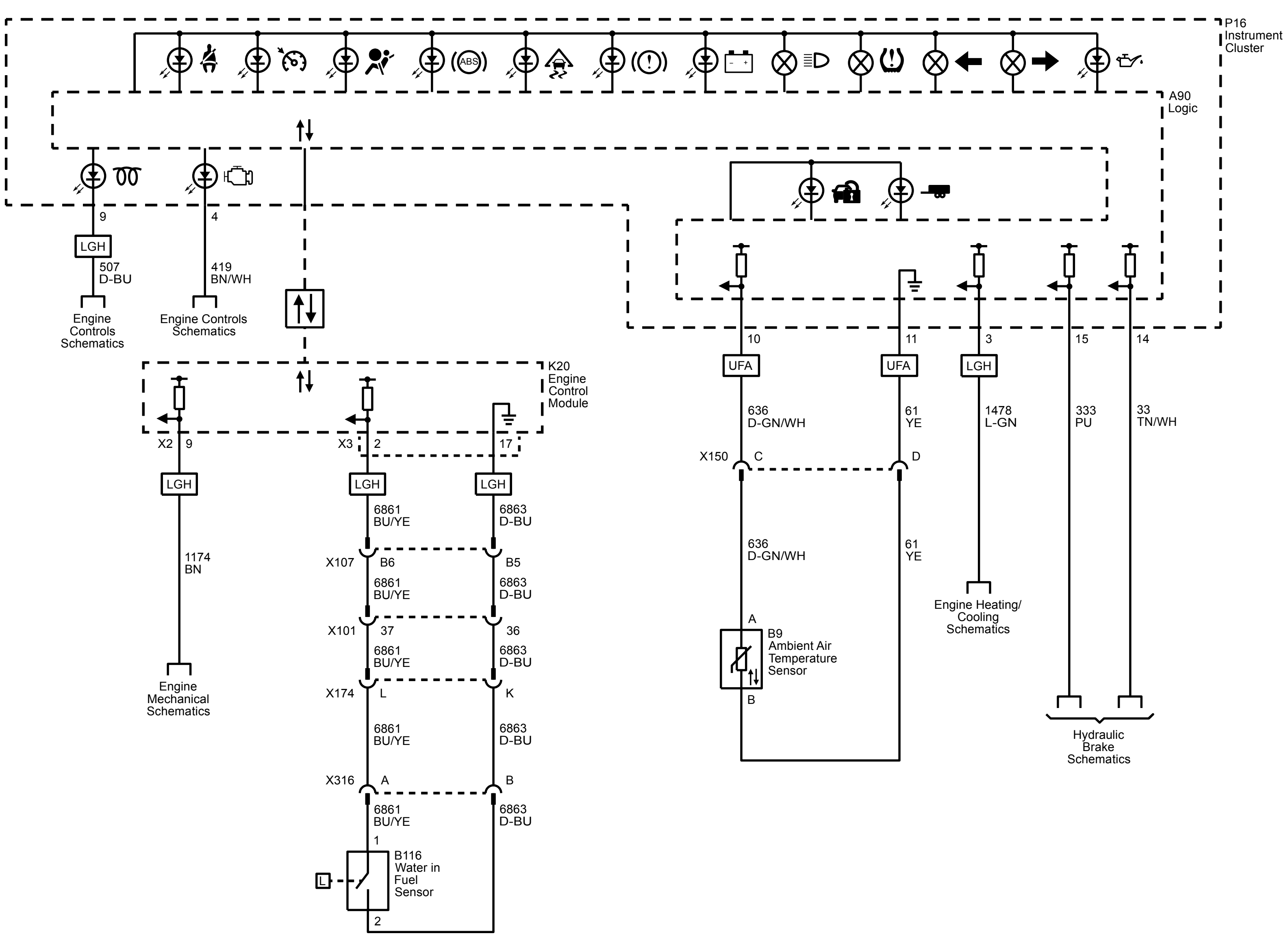
Displays and Gauges

Schematic and Routing Diagrams

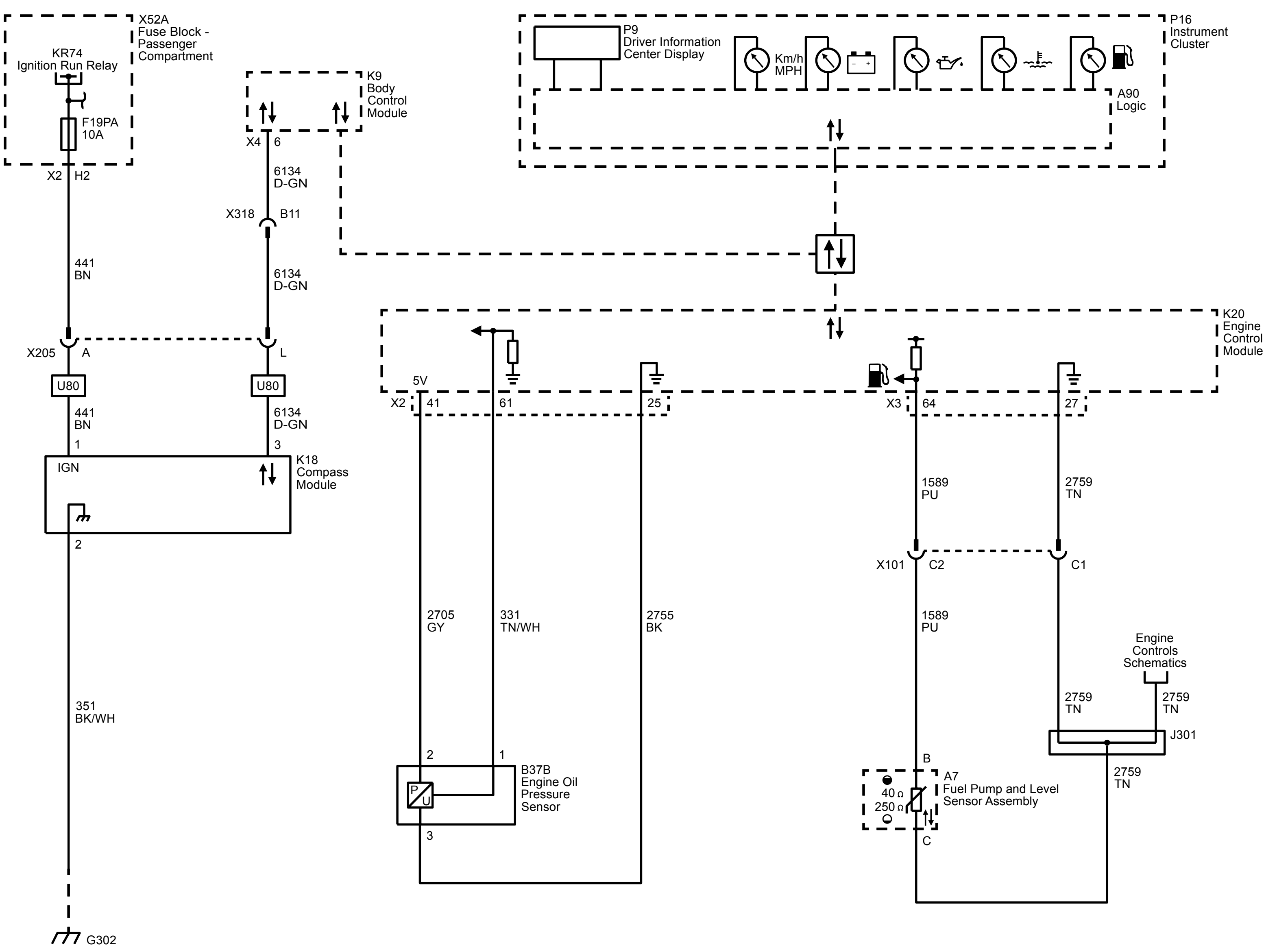
Instrument Cluster Schematics

Power, Ground and Driver Information Center (DIC) Switch

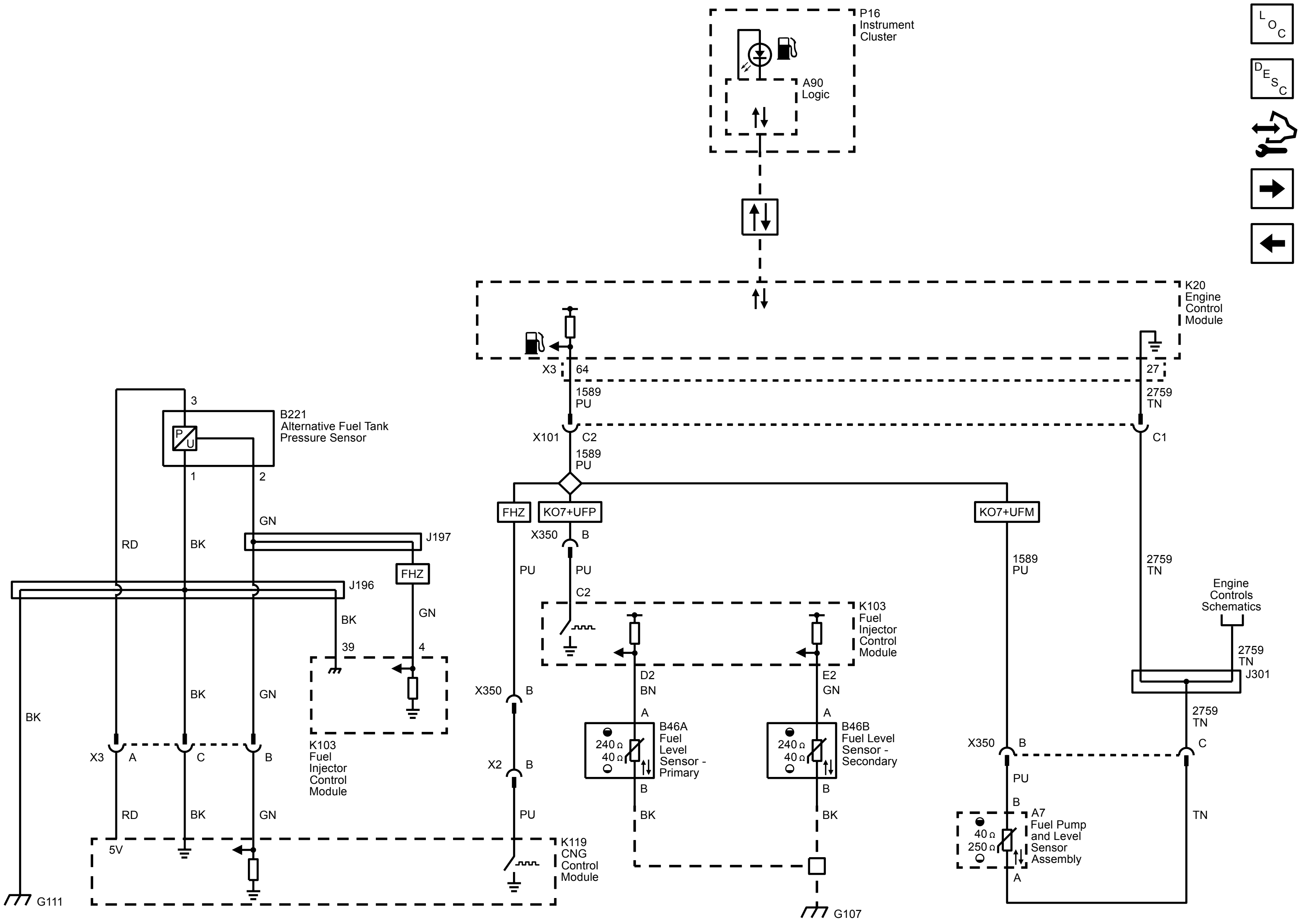

B+
X50A
Fuse Block -
Underhood
KR93
Ignition Run/Crank
Relay
F10UA
10A
F27UA
10A
X3
A1
A2
B+
X52A
Fuse Block -
Passenger
Compartment
F23PA
10A
X1
H6
8S8
-8S8
1639
PK
2840
RD/WH
Data
Communication
Schematics
5060
D-GN
19
20
1
P16
Instrument
Cluster
A5
Driver Information
Center
IGN
B+
A90
Logic
7
16
17
18
393
PK
1358
D-GN/WH
897
BN
351
BK/WH
3
1
2
S16
Driver
Information
Center
Switch
2K Ω
1K Ω
510 Ω
510 Ω
5
351
BK/WH
G302


P16 Instrument Cluster
A90 Logic
ABS
9
LGH
507
D-BU
Engine Controls Schematics
4
419
BN/WH
Engine Controls Schematics
K20 Engine Control Module
X2
9
LGH
1174
BN
Engine Mechanical Schematics
X3
2
17
LGH
6861
BU/YE
LGH
6863
D-BU
X107
B6
B5
6861
BU/YE
6863
D-BU
X101
37
36
6861
BU/YE
6863
D-BU
X174
L
K
6861
BU/YE
6863
D-BU
X316
A
B
6861
BU/YE
6863
D-BU
1
B116 Water in Fuel Sensor
L
2
10
UFA
636
D-GN/WH
11
UFA
61
YE
X150
C
D
636
D-GN/WH
61
YE
A
B9 Ambient Air Temperature Sensor
B
3
LGH
1478
L-GN
Engine Heating/ Cooling Schematics
15
333
PU
14
33
TN/WH
Hydraulic Brake Schematics

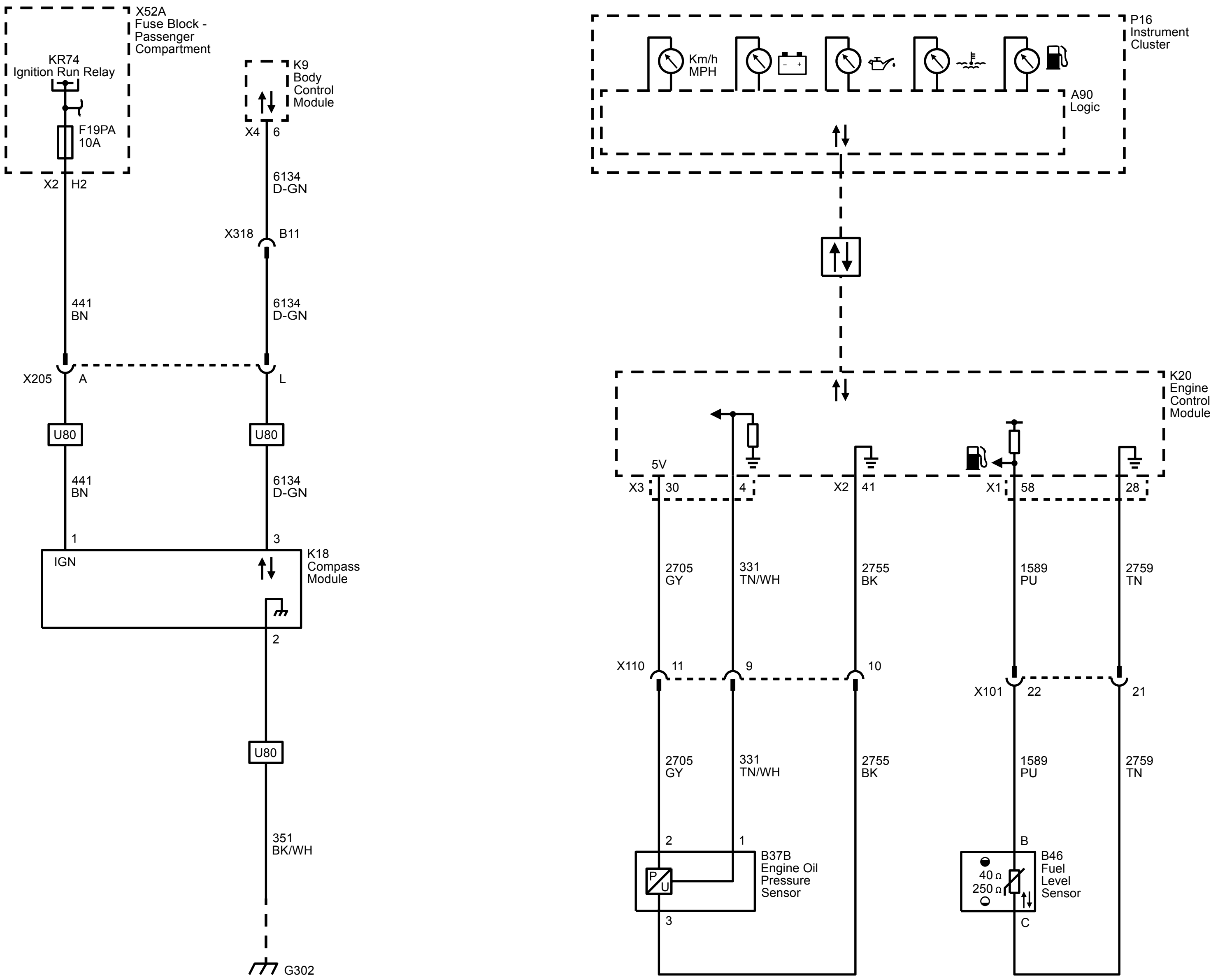
Gauges (L20 or L96)


X52A
Fuse Block -
Passenger
Compartment
KR74
Ignition Run Relay
F19PA
10A
X2
H2
441
BN
X205
A
U80
441
BN
1
IGN
2
351
BK/WH
G302
K9
Body
Control
Module
X4
6
6134
D-GN
X318
B11
6134
D-GN
L
U80
6134
D-GN
3
K18
Compass
Module
P9
Driver Information
Center Display
Km/h
MPH
P16
Instrument
Cluster
A90
Logic
K20
Engine
Control
Module
5V
X2
41
61
25
X3
64
27
2705
GY
331
TN/WH
2755
BK
2
1
B37B
Engine Oil
Pressure
Sensor
P
U
3
1589
PU
2759
TN
X101
C2
C1
1589
PU
Engine
Controls
Schematics
2759
TN
2759
TN
J301
B
A7
Fuel Pump and Level
Sensor Assembly
40 Ω
250 Ω
C
2759
TN

Fuel Gauge (LC8)

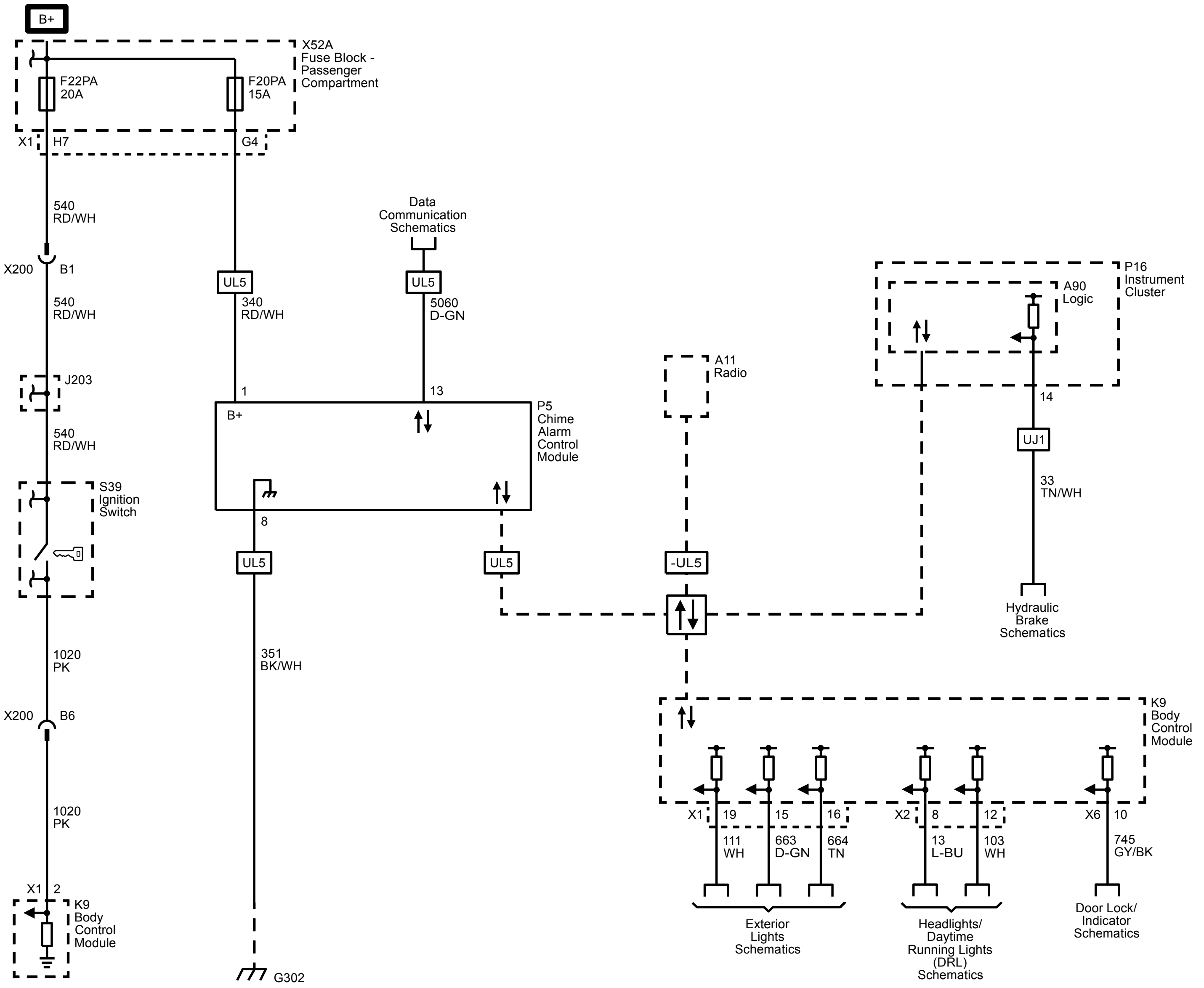

P16 Instrument Cluster
A90 Logic
K20 Engine Control Module
X3 64
27
1589 PU
2759 TN
X101 C2
C1
FHZ
KO7+UFP
KO7+UFM
X350 B
PU
C2
K103 Fuel Injector Control Module
D2 BN
E2 GN
A
B46A Fuel Level Sensor - Primary
B46B Fuel Level Sensor - Secondary
240 Ω
40 Ω
250 Ω
B
BK
G107
B221 Alternative Fuel Tank Pressure Sensor
3
1
2
P U
GN
J197
J196
RD
BK
39
4
X3 A C B
5V
K119 CNG Control Module
X2 B
G111
Engine Controls Schematics
J301
X350 C
A7 Fuel Pump and Level Sensor Assembly
TN

Compass and Gauges (LWN)


X52A
Fuse Block - Passenger Compartment
KR74
Ignition Run Relay
F19PA
10A
X2
H2
441
BN
K9
Body Control Module
X4
6
6134
D-GN
X318
B11
6134
D-GN
441
BN
X205
A
L
U80
U80
441
BN
6134
D-GN
1
3
IGN
K18
Compass Module
2
U80
351
BK/WH
G302
P16
Instrument Cluster
Km/h
MPH
A90
Logic
K20
Engine Control Module
5V
X3
30
4
X2
41
X1
58
28
2705
GY
331
TN/WH
2755
BK
1589
PU
2759
TN
X110
11
9
10
X101
22
21
2705
GY
331
TN/WH
2755
BK
1589
PU
2759
TN
2
1
P
U
B37B
Engine Oil Pressure Sensor
3
B
40 Ω
250 Ω
B46
Fuel Level Sensor
C

Audible Warnings Schematics

Audible Warnings


B+
X52A
Fuse Block - Passenger Compartment
F22PA
20A
F20PA
15A
X1
H7
G4
540
RD/WH
X200
B1
540
RD/WH
J203
540
RD/WH
S39
Ignition Switch
1020
PK
X200
B6
1020
PK
X1
2
K9
Body Control Module
UL5
340
RD/WH
1
B+
P5
Chime Alarm Control Module
8
UL5
351
BK/WH
G302
Data Communication Schematics
UL5
5060
D-GN
13
UL5
A11
Radio
-UL5
P16
Instrument Cluster
A90
Logic
14
UJ1
33
TN/WH
Hydraulic Brake Schematics
K9
Body Control Module
X1
19
15
16
X2
8
12
X6
10
111
WH
663
D-GN
664
TN
13
L-BU
103
WH
745
GY/BK
Exterior Lights Schematics
Headlights/ Daytime Running Lights (DRL) Schematics
Door Lock/ Indicator Schematics

Description and Operation

Driver Information Center (DIC) Description and Operation

The driver information center (DIC) displays the DIC WOW for 5 seconds when it first powers up. If enabled through Personalization, the DIC then returns to the last display status before no power condition.

There are 4 switch functions for the DIC.

- Personalization
- Set/Reset
- Trip/Fuel
- Vehicle Information

Trip/Fuel

The Trip/Fuel switch is used to navigate between vehicle information parameters. Cycle through the following vehicle parameters by successive pressing of the Trip/Fuel switch.

- Average Fuel Economy (AFE)
- Average Vehicle Speed (AV5)
- Blank Display
- Elapsed Time
- Fuel Range
- Fuel Used
- Instantaneous Fuel Economy (IFE)/ Active Fuel Management (AFM)
- Season Odometer
- Trip A
- Trip B

Vehicle Information

The vehicle information switch is used to navigate between vehicle information parameters. Cycle through the following vehicle parameters by successive pressing of the vehicle information switch.

- Blank Display
- Compass Zone Setting
- Compass Recalibration
- Display Units Menu
- Front Tire Pressures
- Fuel Filter Life
- Hourmeter
- Key Fob Programming Menu
- Left Front Tire Pressure
- Left Rear Tire Pressure
- Oil Life Index (OLI)
- Rear Tire Pressures
- Right Front Tire Pressure
- Right Rear Tire Pressure
- Tire Programming Menu

Personalization

The personalization switch is used to set personalization features for both the vehicle and the driver. Many of the parameters in the Trip/Fuel menu and the Vehicle Information menu can be programmed through the personalization switch. In addition to the parameters in the Trip/Fuel and Vehicle Information menus, the following features can also be programmed.

- Approach Lighting
- Automatic Door Lock

- Automatic Door Unlock
- Chime Volume
- Delayed Door Lock
- Display Language
- Elevated Idle
- Exit Lighting
- Remote Door Lock
- Remote Door Unlock

Average Fuel Economy

Average fuel economy is calculated using the equation: AFE = Distance/Fuel

- Distance = The accumulated distance travelled since the last reset of this value
- Fuel = The accumulated fuel consumption since the last reset of this value

The engine control module (ECM) sends the average fuel economy serial data message to the instrument panel cluster (IPC). The value of this mode is retained during ignition OFF and can be changed between English units and metric units by selecting from the driver information center (DIC) options menu.

Average Vehicle Speed

Average speed is calculated using the equation: Average Vehicle Speed = AVS Distance/AVS Time

- Distance = The accumulated distance travelled since the last reset of this value
- Ignition On = The accumulated ignition on time since the last reset of this value

Elapsed Time

The timer records elapsed time starting from activation. When the DIC displays the timer, pressing the Set/Reset switch for 3 seconds on the DIC resets the timer. Pressing the Set/Reset button on the DIC switch for approximately 1 second starts and stops the timer. The DIC displays the timer in one of the following formats:

The DIC displays the timer in the following format: XX: XX:XX:

The first XX represents hours elapsed, the second XX represents minutes elapsed, and the third XX represents seconds elapsed. The maximum range of the timer is 99 hours, 59 minutes, and 59 seconds. After the maximum range is reached, the timer displays all zeros (00:00:00).

Fuel Range

This message indicates the estimated distance that the vehicle can travel under the current fuel economy and fuel level conditions since the last battery connection to the IPC. Fuel Range is calculated using the equation: Fuel Range = Range Distance X Fuel Total Capacity/Range Fuel Used.

- Range Distance = The accumulated distance travelled since the last reset of this value.
- Fuel Used = The accumulated fuel delivered since the last reset of this value

The ECM sends the fuel range value to the IPC. The IPC receives a serial data message with fuel information. The fuel range value is retained during ignition OFF and can be changed between English and Metric units by accessing the DIC English/Metric menu. The Fuel Range display cannot be reset. LOW is displayed when fuel range is below a predetermined value.

Fuel Used

The DIC calculates and displays the total amount of fuel used since the last reset operation. You can reset the fuel used mode by depressing and holding the Set/Reset button for more than 3 seconds. The value of this mode is retained during ignition OFF.

Instantaneous Fuel Economy (IFE)

Instantaneous fuel economy (IFE) is calculated using the equation: IFE = Distance/Fuel Used.

- Distance = The accumulated distance travelled for the last 2 seconds
- Fuel = The accumulated fuel delivered for the last 2 seconds

The IPC receives a serial data message from the ECM. The distance information is calculated by the IPC using the vehicle speed information from the ECM. These values are retained during ignition OFF and can be changed between English and Metric units accessing the DIC English/Metric menu. The IFE display cannot be reset.

Oil Life Remaining

The ECM sends the oil life remaining percentage to the IPC via a serial data message. The instrument panel cluster receives a serial data message indicating the engine oil life remaining. The DIC displays the current percentage of the GM Oil Life System as determined by the ECM. When the oil life remaining percentage drops below 5 percent, the DIC displays CHANGE ENGINE OIL SOON. When the engine oil is changed, reset the GM Oil Life System. Refer to CELL Link Error - Link target cell (cell ID 53271) is invalid for this publication..

Tire Pressure Monitor

The IPC receives a serial data message from the tire pressure monitoring (TPM) system for front and rear tire pressure data. The DIC will display the pressure for each of the front and rear tires. When a tire with low air pressure is present, the DIC displays XXXX XXXX TIRE PRESSURE LOW.

Fuel Display

Parameter	Update Rate	Range	Reset Value	Units
Average Fuel Economy	1 second	0.0 – 99.9	99.9	MPG or L / 100 KM
Instant Fuel Economy	2 seconds	0 – 70	N/A	MPG or L / 100 KM
Fuel Range	1 second	0 – 999	N/A	MI/KM
Fuel Used	1 second	0 – 999.9	0.0	Gal/L

English/Metric

The English/Metric mode is used to toggle between English and Metric units and can be accessed through the driver information center (DIC) vehicle information switch.

Trip A/B

The trip odometer A or B can be accessed through the DIC Trip/Fuel switch function.

Trip Display

DIC Trip Display	Range	
	Metric	**English**
ODOMETER	######km	######MI
TRIP A	####.#km	####.#MI
TRIP B	####.#km	####.#MI

Language

The driver information center (DIC) is capable of displaying in 4 languages

- English
- French
- Spanish
- Arabic

Fuel Filter Life

The engine control module (ECM) sends the fuel filter life remaining percentage to the instrument panel cluster (IPC) via the serial data circuit. The instrument panel cluster receives a serial data message indicating the fuel filter life remaining. The driver information center (DIC) displays the current percentage of the fuel filter life as determined by the ECM. When the fuel filter life remaining parameter drops below 5 percent, the DIC displays the CHANGE FUEL FILTER message. The fuel filter life parameter can be reset by pressing the Set/Reset switch for 2 seconds. The fuel filter life parameter only applies to vehicles equipped with diesel engine.

Compass (without Onstar)

The driver information center (DIC) displays the compass based on serial data message from the BCM. The compass module communicates with the body control module (BCM) through a bi-directional data circuit. The instrument panel cluster (IPC) receives compass information from the BCM via the serial data circuit. The compass is displayed in the DIC with other vehicle information and is at the bottom line of the DIC. The compass display shows “- -” when a malfunction is present with the compass module or a compass serial data communication fault exists. The compass displays 'CAL' or 'C' when the compass needs to be calibrated. Cycle the ignition before performing the compass magnetic variation adjustment procedure.

Check that the compass module is properly installed in the vehicle since this may cause the compass to malfunction. The embossed arrow on the top of the compass module should be parallel to the centerline of the vehicle.

Compass (with Onstar)

The driver information center (DIC) displays the compass based on serial data message from the Vehicle Communication Interface Module (VCIM). The compass is displayed in the DIC with other vehicle information and is at the bottom line of the DIC. The compass displays 'CAL' or 'C' when the DIC has not received compass information from the VCIM.

Ambient Air Temperature

The ambient air temperature is read by the instrument panel cluster (IPC) and displayed in the driver information center (DIC). The IPC provides the logic for reading the outside air temperature sensor. The IPC is responsible for displaying the temperature and converting to Fahrenheit. The instrument panel cluster (IPC) applies 5 volts to the ambient air temperature sensor. The ambient air temperature sensor is a thermistor which varies in resistance as the temperature changes. As the resistance of the ambient air temperature sensor increases, the IPC senses a larger voltage drop across the sensor, indicating a lower temperature. As the resistance of the ambient air temperature sensor decreases, the IPC senses a smaller voltage drop across the sensor, indicating a higher temperature. The IPC is responsible for displaying the temperature and converting to degrees Fahrenheit if necessary.

If the ambient air temperature sensor resistance is less than 328 ohms, the IPC displays 'SC' (short circuit) in the DIC and this corresponds to a temperature of 125°C (257°F). If the ambient air temperature sensor resistance is greater than 353.37K ohms, the IPC displays 'OC' (open circuit) in the DIC and this corresponds to a temperature less than −40°C (−40°F). The IPC displays '– –' in the DIC when the IPC receives an invalid signal or a loss of serial data communication.

Indicator/Warning Message Description and Operation

INDICATOR LIGHT ON

Refer to the OWNER'S MANUAL for the descriptions and explanations of all indicator lights.

For diagnosis and repair information related to an indicator light refer to the System Diagnosis and the Description of Operation that the message relates to.

MESSAGE DISPLAYED

Refer to the OWNER'S MANUAL for descriptions and explanations of all messages displayed.

For diagnosis and repair information related to a displayed message refer to the System Diagnosis and the Description of Operation that the message relates to.

CHANGE TIMING BELT MESSAGE

The Instrument Cluster monitors the odometer mileage to determine when timing belt (if equipped) replacement may be necessary. After the vehicle has accumulated approximately 100,000 miles (160,000 kilometers), the Instrument Cluster may display the CHANGE TIMING BELT message. After the engine timing belt has been replaced, reset the CHANGE TIMING BELT message by locating and removing the fuses that supply power to the Instrument Cluster for two minutes.

BRAKES OVERHEATED

The Electronic Brake Control Module monitors brake usage and compares it to an internal thermal model to determine if the brakes could become overheated. If the Electronic Brake Control Module determines the brakes pads have exceeded a desirable temperature based on the thermal model, it sends a serial data message to the Instrument Cluster to display the BRAKES OVERHEATED message. The message remains displayed until the estimated temperature returns to a desirable range.

Transmission Shift Lever Position Indicator

The Transmission Shift Lever Position Indicator (if equipped) is located on the center console and indicates the current transmission shift lever position. The Transmission Shift Lever Position Indicator receives power and ground and is controlled by the Body Control Module (BCM) via serial data. The Transmission Control Module determines transmission shift lever position based on signals from the Transmission Internal Mode Switch and sends the shift lever position information to the BCM via serial data.

Instrument Cluster Description and Operation

Displays Test

Certain instrument panel cluster (IPC) features are tested when the ignition is turned on in order to verify the features are working properly. The following occurs at key up:

- The air bag indicator flashes 7 times (not IPC controlled).
- The ABS indicator illuminates briefly.
- The battery indicator illuminates briefly.
- The brake indicator illuminates briefly.
- The cruise engage indicator illuminates briefly.
- The engine oil pressure indicator illuminates briefly.
- The malfunction indicator lamp (MIL) illuminates briefly (not IPC controlled).
- The seat belt indicator illuminates for 70 seconds or until the driver seat belt is latched (not IPC controlled).
- The security indicator illuminates briefly.
- The tire pressure low indicator illuminates briefly.
- The vehicle dynamics caution (VDC) indicator illuminates briefly.
- All segments of the driver information center (DIC) illuminate briefly.
- All odometer segments illuminate briefly.
- The PRNDL segment illuminates briefly.

Indicators and Warning Messages

Refer to Indicator/Warning Message Description and Operation , Data Link Communications Description and Operation , and Body Control System Description and Operation.

Engine Coolant Temperature Gauge

The instrument panel cluster (IPC) displays the engine coolant temperature as determined by the engine control module (ECM). The IPC receives a serial data message from the ECM indicating the engine coolant temperature. The engine coolant temperature gauge defaults to 60°C (140°F) or below if:

- The ECM detects a malfunction in the engine coolant temperature sensor circuit.
- The IPC detects a loss of serial data communications with the ECM.
- The body control module (BCM) detects a loss of serial communications with the ECM.

Fuel Gauge

The instrument panel cluster (IPC) displays the fuel level as determined by the ECM. The IPC receives a serial data message from the ECM indicating the fuel level percent. The fuel gauge defaults to empty if:

- The ECM detects a malfunction in the fuel level sensor circuit.
- The IPC detects a loss of serial data communications with the ECM

The fuel level sensor changes resistance in response to the fuel level. When the fuel tank is full, the sensor resistance is low and the ECM senses a low signal voltage. When the fuel tank is empty, the sensor resistance is high and the ECM senses a high signal voltage. The ECM uses the signal circuit of the fuel level sensor in order to calculate the percentage of remaining fuel in the tank. The ECM sends the fuel level percentage via the serial data circuit to the instrument cluster in order to control the fuel gauge. When the fuel level is less than a pre-determined value, the low fuel indicator illuminates in the IPC.

Fuel Gauge CNG

The alternative fuel tank pressure sensor is a 3-wire sensor comprising of the signal circuit, the low reference circuit and a 5 V reference circuit. The compressed natural gas control module (CNGCM) monitors the signal of the pressure sensor to determine the amount of pressure in the tank. The CNGCM uses this signal in order to calculate the percentage of remaining gas in the tank and converts it to a PWM signal sent to the ECM. The ECM sends the fuel level percentage via the serial data circuit to the instrument cluster in order to control the fuel gauge.

Fuel Gauge LPG

The liquid propane gas control module monitors the signal of the of the primary fuel level sensor to determine the amount of liquid propane in the tank. The liquid propane gas control module uses this signal in order to calculate the percentage of remaining liquid propane gas in the tank and converts it to a PWM signal sent to the ECM. The ECM sends the fuel level percentage via the serial data to the instrument cluster in order to control the fuel gauge. The secondary fuel level sensor is only used as a input to the liquid propane gas control module to transfer fuel to the primary tank. The primary and secondary fuel level sensors have a resistance value of 40 to 240 Ohms. When the fuel tank is full, the resistance of the sensor should be around 40 Ohms and around 240 Ohms when empty.

Odometer

The vehicle odometer is calculated and stored electronically in the instrument panel cluster (IPC). The IPC contains a season odometer and trip odometer A or B. Momentarily press the DIC trip/fuel button on the IPC in order to toggle between the season odometer and the trip odometer. Press the DIC set/reset button for greater than 0.25 seconds, while the trip odometer is displayed, in order to reset the trip odometer. The IPC displays the vehicle mileage and trip mileage as determined by the IPC. The IPC calculates the mileage based on the serial data vehicle speed information from the ECM. The odometer will display 'error' if an internal IPC memory failure is detected. The odometer displays either miles or kilometers and can be set through the personalization programming menu in the DIC.

PRNDL Display

The IPC displays the selected gear position as determined by the ECM. The IPC receives a serial data message from the ECM indicating the gear position. The PRNDL display blanks if:

- The ECM detects a malfunction in the transmission range switch circuit.
- The IPC detects a loss of serial data communications with the ECM.

Speedometer

The IPC displays the vehicle speed as determined by the ECM. The IPC calculates the mileage based on the serial data vehicle speed information from the ECM. The speedometer defaults to 0 km/h (0 mph) if the IPC detects a loss of serial data communications with the ECM.

Battery Gauge

The instrument panel cluster (IPC) displays the voltage as determined by the regulated voltage control (RVC). The IPC receives a serial data message from the BCM indicating the battery voltage. When the engine is ON, the gauge should be between 10–16 volts. The gauge will default to 0 volts if the IPC detects a loss of communication with the BCM.

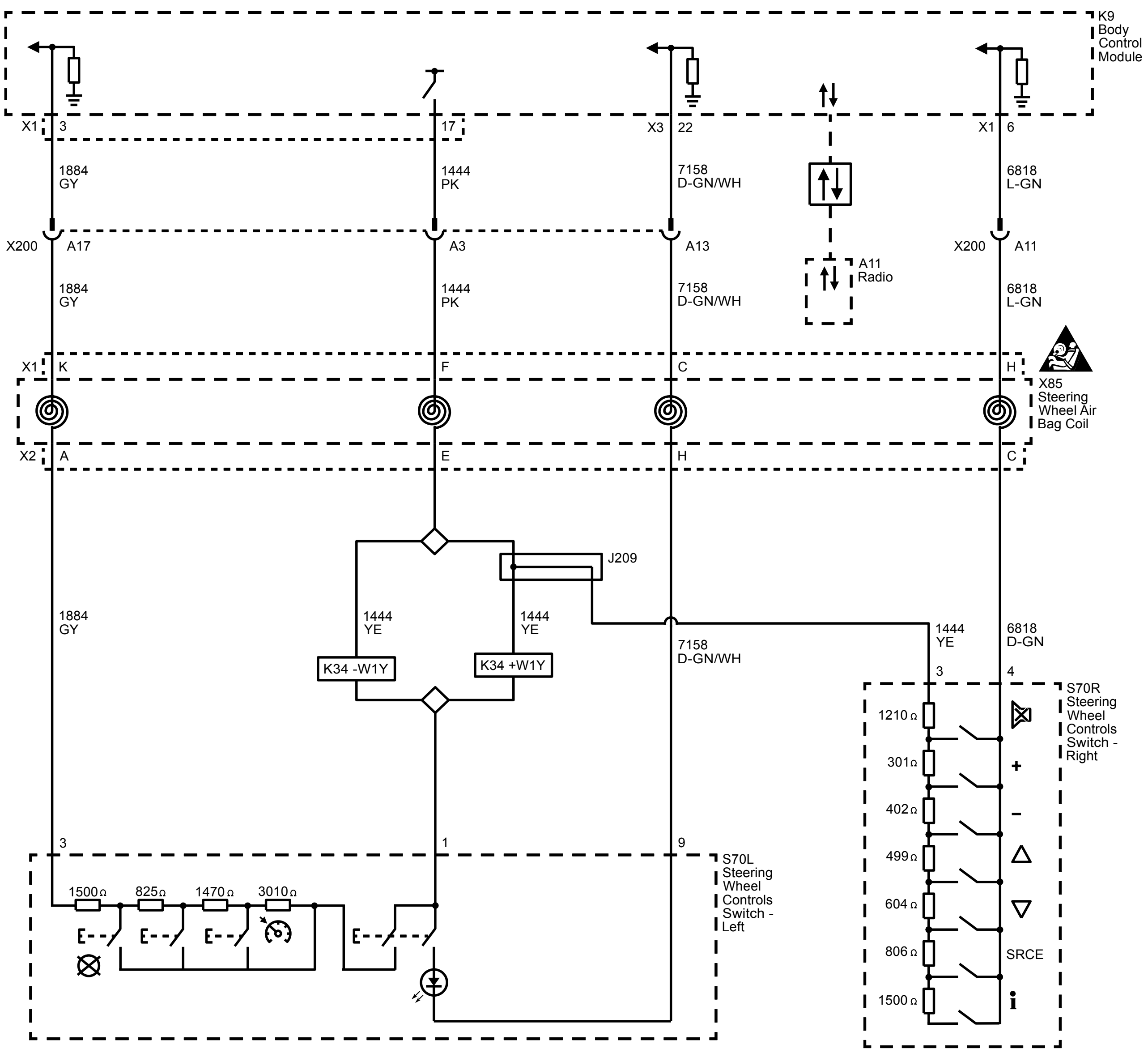
Driver Information and Entertainment

Secondary and Configurable Customer Controls

Schematic and Routing Diagrams

Steering Wheel Secondary/Configurable Control Schematics

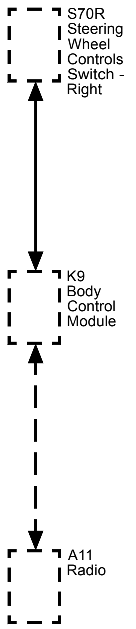
Steering Wheel Secondary/Configurable Controls


K9
Body
Control
Module
X1
3
17
X3
22
X1
6
1884
GY
1444
PK
7158
D-GN/WH
6818
L-GN
X200
A17
A3
A13
X200
A11
A11
Radio
1884
GY
1444
PK
7158
D-GN/WH
6818
L-GN
X1
K
F
C
H
X85
Steering
Wheel Air
Bag Coil
X2
A
E
H
C
J209
1884
GY
1444
YE
1444
YE
7158
D-GN/WH
1444
YE
6818
D-GN
K34 -W1Y
K34 +W1Y
3
4
S70R
Steering
Wheel
Controls
Switch -
Right
1210Ω
301Ω
402Ω
499Ω
604Ω
806Ω
1500Ω
+
–
SRCE
i
3
1
9
S70L
Steering
Wheel
Controls
Switch -
Left
1500Ω
825Ω
1470Ω
3010Ω

Description and Operation

Steering Wheel Controls Description and Operation

Steering Wheel Controls Block Diagram



The steering wheel control switches duplicate the function of the primary controls of the associated component, through a network of momentary contact switches and a series of resistors. The body control module (BCM) supplies voltage to the switches and monitors the return signal. When a switch is pressed, a specific voltage drops across the resistor unique to that switch. The BCM identifies the switch selected and sends a serial data message to the component controlled by the switch, activating the feature.

This section is intended to diagnose the circuits between the BCM and the steering wheel control switches. If the primary control for the device is inoperative, refer to the appropriate section for the component the steering wheel control switch is used for.

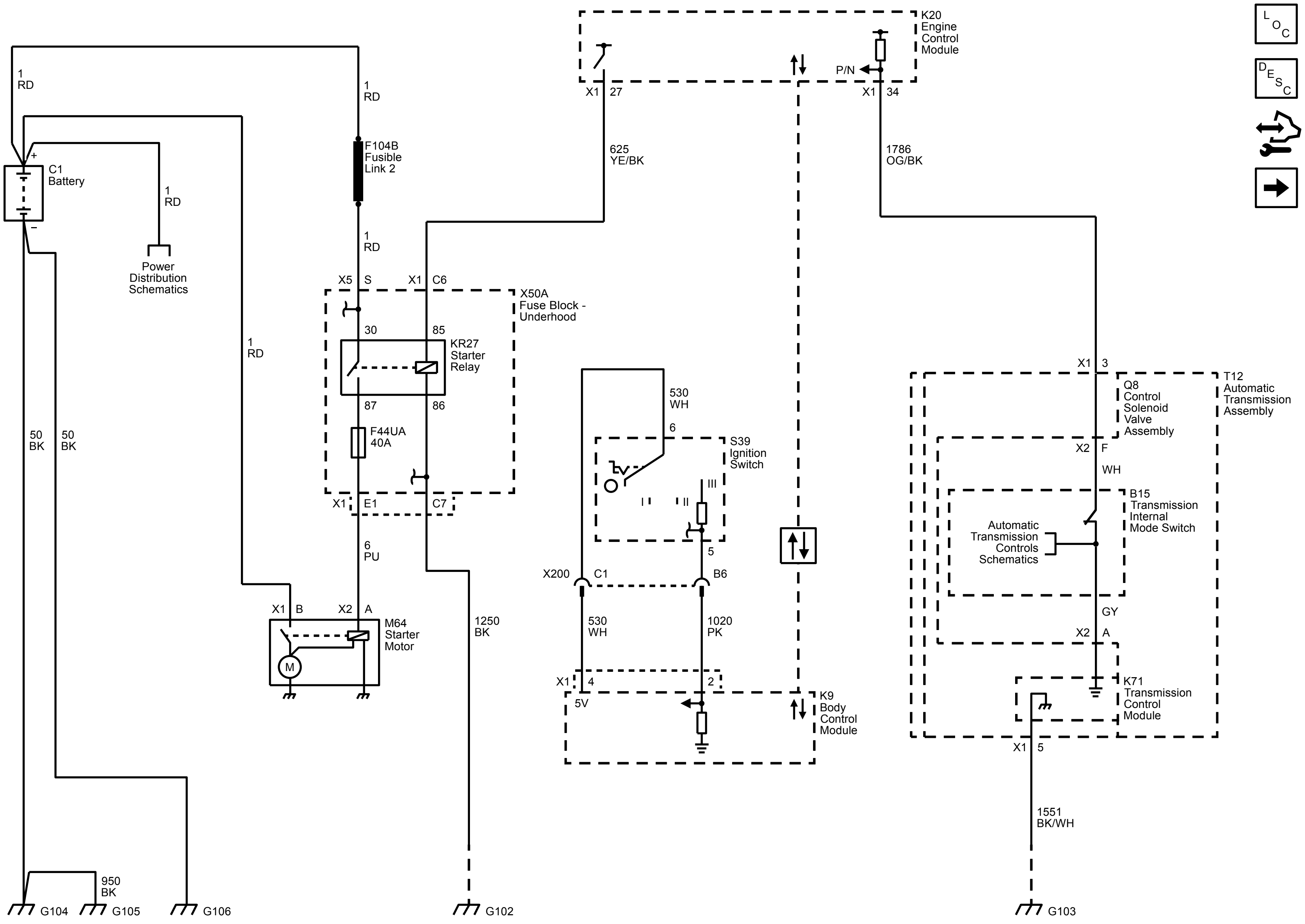
Engine/Propulsion

12 V Starting and Charging

Schematic and Routing Diagrams

Starting and Charging Schematics

Starting System (Gas with One Battery)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Distribution
Schematics
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Fuse Block -
Underhood
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Starter
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X2 A
M64
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Motor
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S39
Ignition
Switch
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X1 3
Q8
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Solenoid
Valve
Assembly
T12
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Transmission
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Mode Switch
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Transmission
Controls
Schematics
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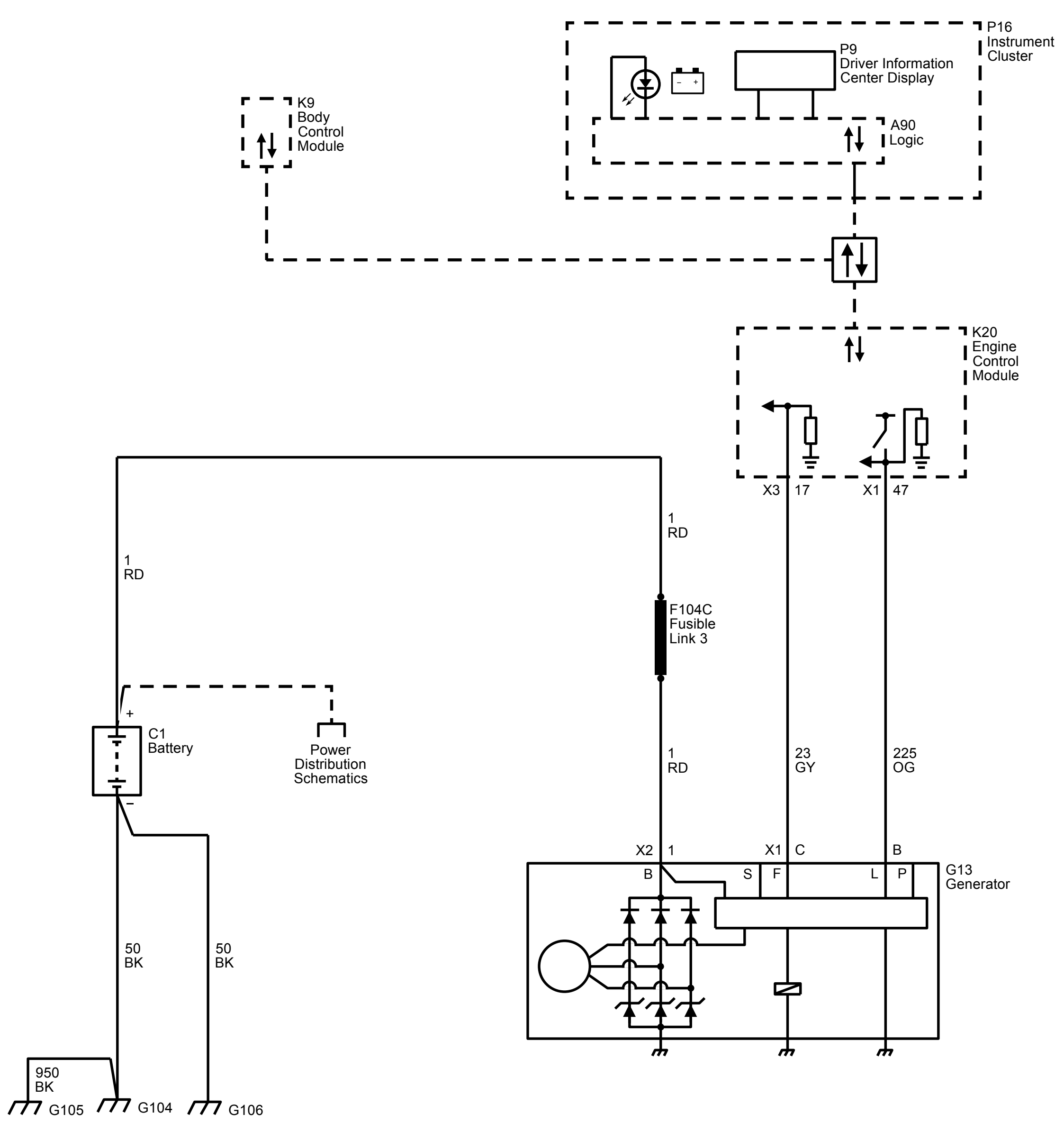
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Cluster
P9
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Center Display
A90
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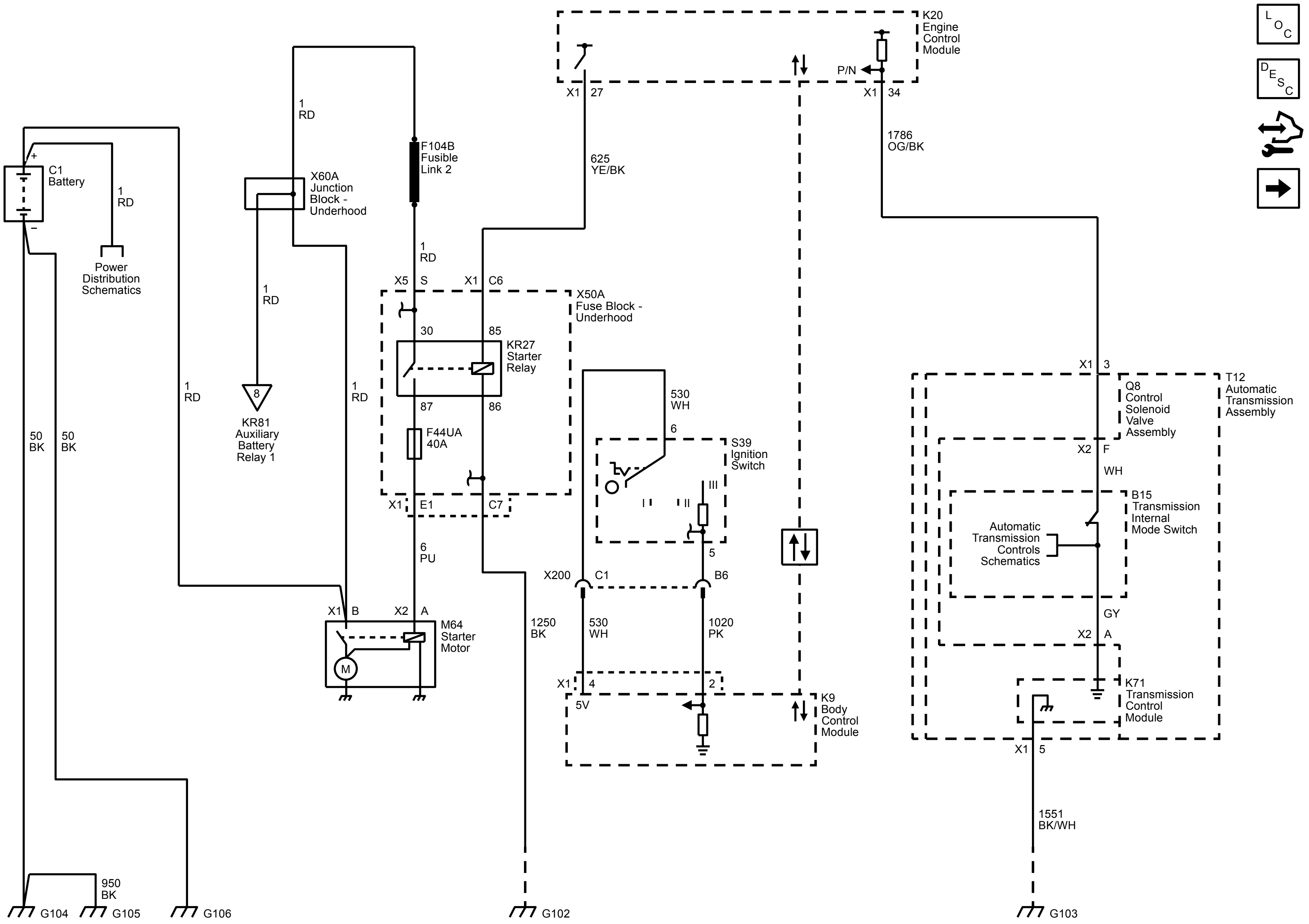
Starting System (Gas with Two Batteries)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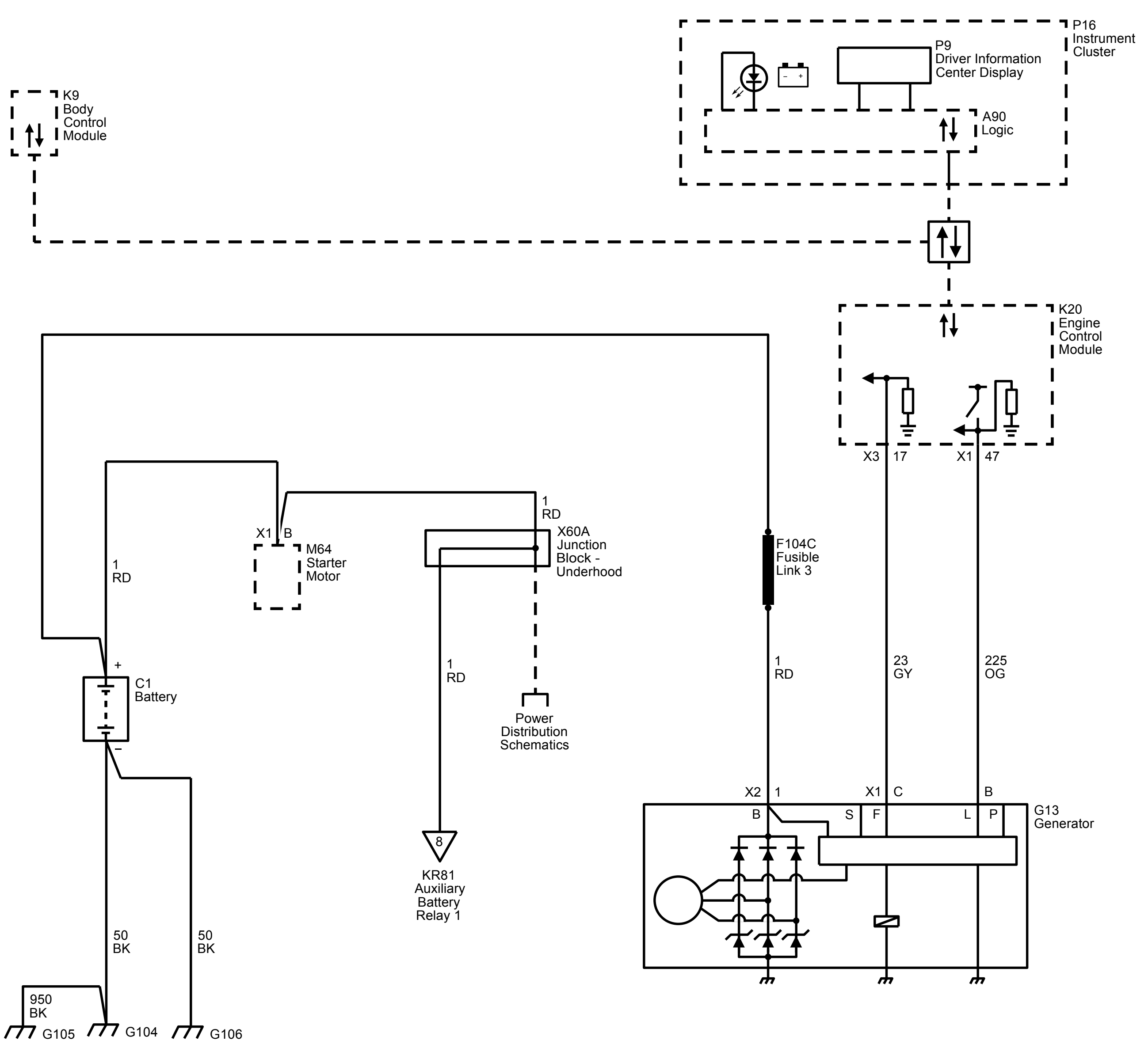
Charging System (Gas with Two Batteries)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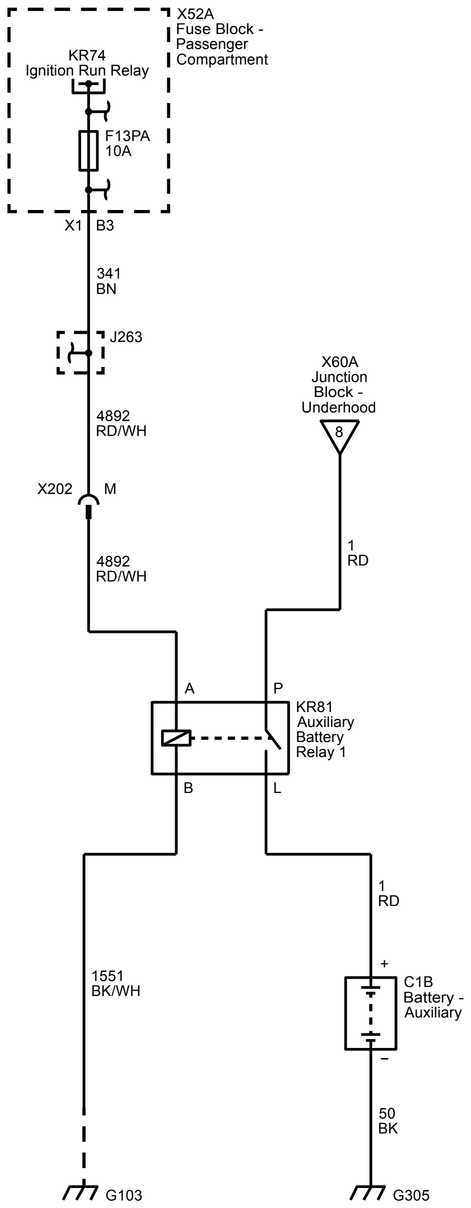
Auxiliary Battery Relay and Auxiliary Battery (Gas with Two Batteries)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Junction Block - Underhood
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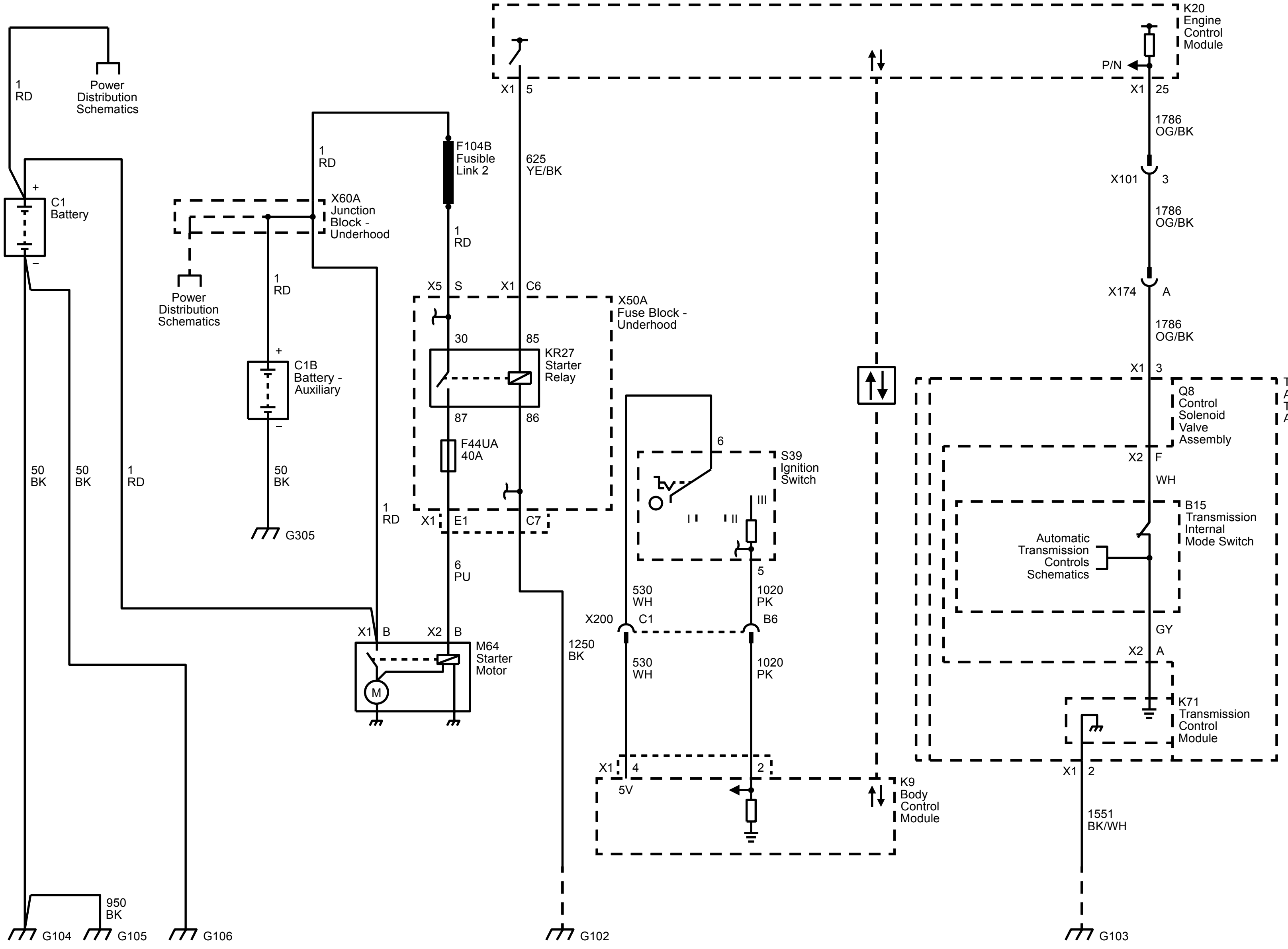
Starting System (Diesel)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T12
Automatic
Transmission
Assembly
Q8
Control
Solenoid
Valve
Assembly
X2 F
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B15
Transmission
Internal
Mode Switch
Automatic
Transmission
Controls
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GY
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K71
Transmission
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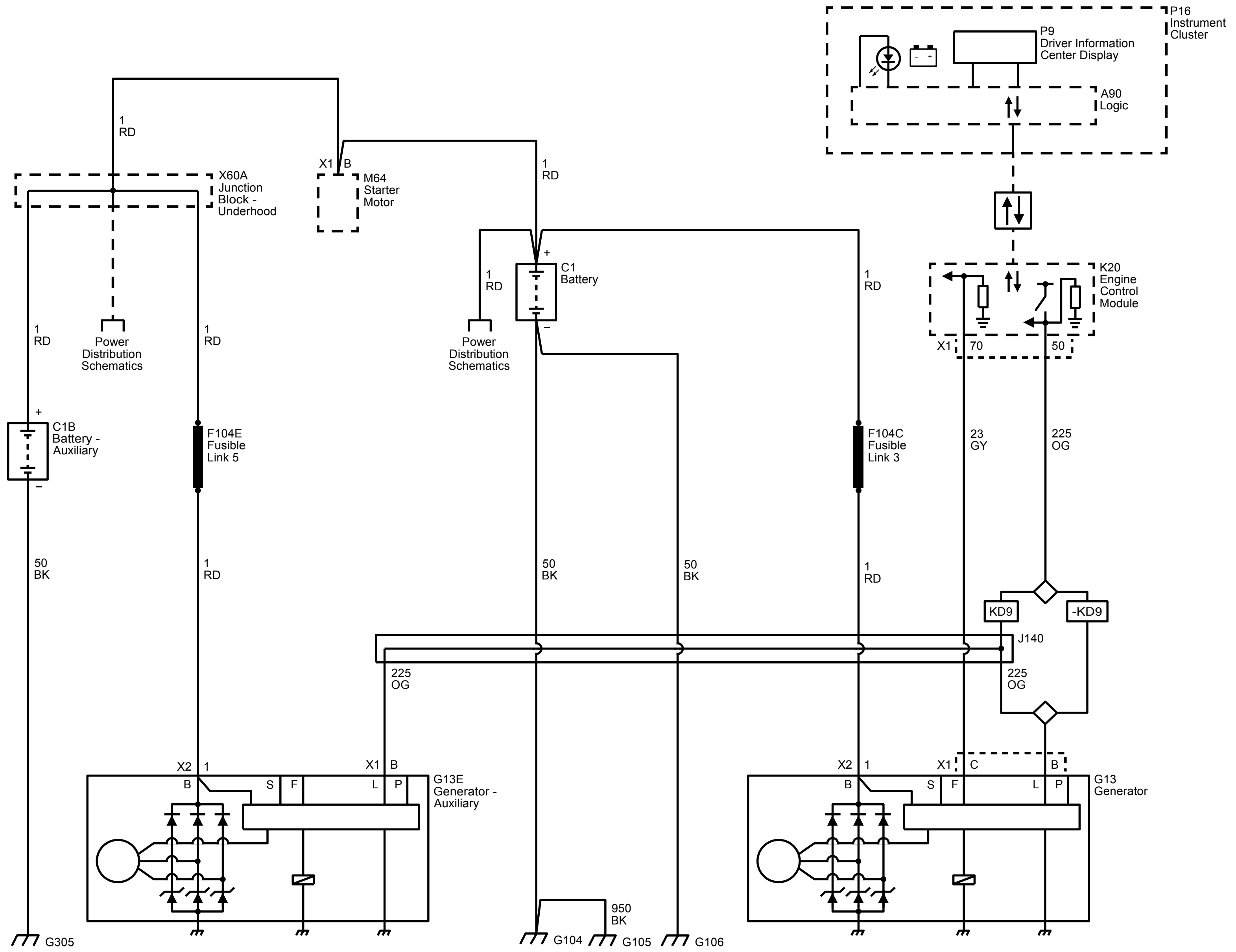
Charging System (Diesel)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F104C
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Description and Operation

Battery Description and Operation

Warning: Batteries produce explosive gases, contain corrosive acid, and supply levels of electrical current high enough to cause burns. Therefore, to reduce the risk of personal injury when working near a battery:

- **Always shield your eyes and avoid leaning over the battery whenever possible.**
- **Do not expose the battery to open flames or sparks.**
- **Do not allow the battery electrolyte to contact the eyes or the skin. Flush immediately and thoroughly any contacted areas with water and get medical help.**
- **Follow each step of the jump starting procedure in order.**
- **Treat both the booster and the discharged batteries carefully when using the jumper cables.**

Batteries that are no longer wanted must be disposed of by an approved battery recycler and must never be thrown in the trash or sent to a landfill.

Batteries that are not part of the vehicle itself, not the battery under the hood, must only be transported on public streets for business purposes via approved hazardous material transportation procedures.

Battery storage, charging and testing facilities in repair shops must meet various requirements for ventilation, safety equipment, material segregation, etc.

The maintenance free battery is standard. There are no vent plugs in the cover. The battery is completely sealed except for 2 small vent holes in the side. These vent holes allow the small amount of gas that is produced in the battery to escape.

The battery has 3 functions as a major source of energy:

- Engine cranking
- Voltage stabilizer
- Alternate source of energy with generator overload

Battery Low Start Vehicle Message

The body control module (BCM) monitors battery positive voltage to determine battery state of charge. If one or more of the BCM battery positive voltage terminals measure less than approximately 11.6V compared to the BCM ground circuits, this message will display and four chimes may sound. Start the vehicle immediately. If the vehicle is not started and the battery continues to discharge, the climate controls, heated seats, and audio systems will shut off and the vehicle may require a jump start. These systems will function again after the vehicle is started.

Battery Ratings

A battery has 2 ratings:

- Cold cranking amperage
- Amperage hours

When a battery is replaced use a battery with similar ratings. See battery specification label on the original battery.

Amperage Hours

The amperage hour rating tells you how much amperage is available when discharged evenly over a 20 hour period. The amperage hour rating is cumulative, so in order to know how many constant amperage the battery will output for 20 h, you have to divide the amperage hour rating by 20. Example: If a battery has an amperage hour rating of 74, dividing by 20 = 3.75. Such a battery can carry a 3.75 A load for 20 hours before dropping to 10.5 V. (10.5 V is the fully discharged level, at which point the battery needs to be recharged.) A battery with an amperage hour rating of 55 will carry a 2.75 A load for 20 hours before dropping to 10.5 V.

Cold Cranking Amperage

The cold cranking amperage is an indication of the ability of the battery to crank the engine at cold temperatures. The cold cranking amperage rating is the minimum amperage the battery must maintain for 30 seconds at −18°C (0°F) while maintaining at least 7.2 V. See battery label for the cold cranking amperage rating of this battery.

Charging System Description and Operation

Electrical Power Management Overview

The electrical power management system is designed to monitor and control the charging system and send diagnostic messages to alert the driver of possible problems with the battery and generator. This electrical power management system primarily utilizes existing on-board computer capability to maximize the effectiveness of the generator, to manage the load, improve battery state-of-charge and life, and minimize the system's impact on fuel economy. The electrical power management system performs 3 functions:

- It monitors the battery voltage and estimates the battery condition.
- It takes corrective actions by boosting idle speeds, and adjusting the regulated voltage.
- It performs diagnostics and driver notification.

The battery condition is estimated during ignition-off and during ignition-on. During ignition-off the state-of-charge of the battery is determined by measuring the open-circuit voltage. The state-of-charge is a function of the acid concentration and the internal resistance of the battery, and is estimated by reading the battery open circuit voltage when the battery has been at rest for several hours.

The state-of-charge can be used as a diagnostic tool to tell the customer or the dealer the condition of the battery. Throughout ignition-on, the algorithm continuously estimates state-of-charge based on adjusted net amp hours, battery capacity, initial state-of-charge, and temperature.

While running, the battery degree of discharge is primarily determined by a battery current sensor, which is integrated to obtain net amp hours.

In addition, the electrical power management function is designed to perform regulated voltage control to improve battery state-of-charge, battery life, and fuel economy. This is accomplished by using knowledge of the battery state-of-charge and temperature to set the charging voltage to an optimum battery voltage level for recharging without detriment to battery life.

The Charging System Description and Operation is divided into 3 sections. The first section describes the charging system components and their integration into the electrical power management. The second section describes charging system operation. The third section describes the instrument panel cluster operation of the charge indicator, driver information center messages, and voltmeter operation.

Charging System Components

Generator

The generator is a serviceable component. If there is a diagnosed failure of the generator it must be replaced as an assembly. The engine drive belt drives the generator. When the rotor is spun it induces an alternating current (AC) into the stator windings. The AC voltage is then sent through a series of diodes for rectification. The rectified voltage has been converted into a direct current (DC) for use by the vehicles electrical system to maintain electrical loads and the battery charge. The voltage regulator integral to the generator controls the output of the generator. It is not serviceable. The voltage regulator controls the amount of current provided to the rotor. If the generator has field control circuit failure, the generator defaults to an output voltage of 13.8 V.

Body Control Module (BCM)

The body control module (BCM) is a GMLAN device. It communicates with the engine control module (ECM) and the instrument panel cluster for electrical power management (electrical power management) operation. The BCM determines the output of the generator and sends the information to the ECM for control of the generator turn on signal circuit. It monitors the generator field duty cycle signal circuit information sent from the ECM for control of the generator. It monitors a battery current sensor, the battery positive voltage circuit, and estimated battery temperature to determine battery state of charge. The BCM performs idle boost.

Battery Current Sensor

The battery current sensor is a serviceable component that is connected to either the negative or positive battery cable at the battery. The battery current sensor is a 3-wire hall effect current sensor. The battery current sensor monitors the battery current. It directly inputs to the BCM. It creates a 5-volt pulse width modulation (PWM) signal of 128 Hz with a duty cycle of 0–100 percent. Normal duty cycle is between 5–95 percent. Between 0–5 percent and 95–100 percent are for diagnostic purposes.

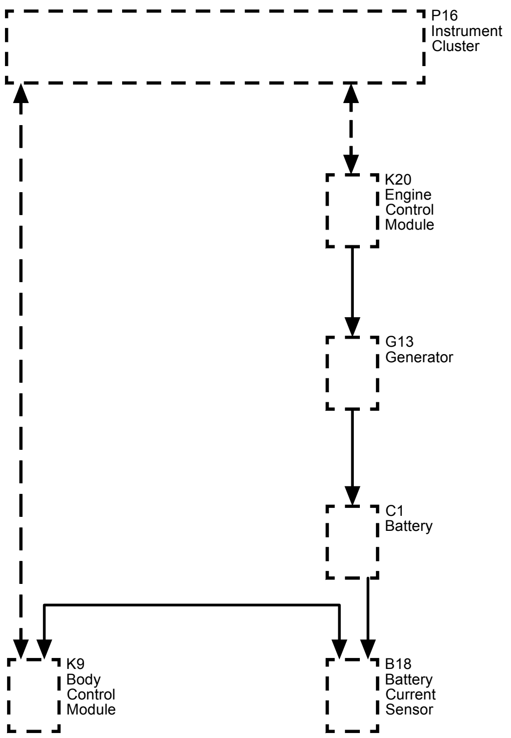
Engine Control Module (ECM)

When the engine is running, the generator turn-on signal is sent to the generator from the ECM, turning on the regulator. The generator's voltage regulator controls current to the rotor, thereby controlling the output voltage. The rotor current is proportional to the electrical pulse width supplied by the regulator. When the engine is started, the regulator senses generator rotation by detecting AC voltage at the stator through an internal wire. Once the engine is running, the regulator varies the field current by controlling the pulse width. This regulates the generator output voltage for proper battery charging and electrical system operation. The generator field duty terminal is connected internally to the voltage regulator and externally to the ECM. When the voltage regulator detects a charging system problem, it grounds this circuit to signal the ECM that a problem exists. The ECM monitors the generator field duty cycle signal circuit, and receives control decisions based on information from the BCM.

Instrument Panel Cluster

The instrument panel cluster provides the customer notification in case a concern with the charging system. There are 2 means of notification, a charge indicator and a driver information center message of SERVICE BATTERY CHARGING SYSTEM if equipped.

Charging System Block Diagram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Control
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G13
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C1
Battery
K9
Body
Control
Module
B18
Battery
Current
Sensor

Charging System Operation

The purpose of the charging system is to maintain the battery charge and vehicle loads. There are 6 modes of operation and they include:

- Battery Sulfation Mode
- Charge Mode
- Fuel Economy Mode
- Headlamp Mode
- Start Up Mode
- Voltage Reduction Mode

The engine control module (ECM) controls the generator through the generator turn ON signal circuit. The ECM monitors the generator performance though the generator field duty cycle signal circuit. The signal is a pulse width modulation (PWM) signal of 128 Hz with a duty cycle of 0–100 percent. Normal duty cycle is between 5–95 percent. Between 0–5 percent and 95–100 percent are for diagnostic purposes. The following table shows the commanded duty cycle and output voltage of the generator:

Commanded Duty Cycle	Generator Output Voltage
10%	11 V
20%	11.56 V
30%	12.12 V
40%	12.68 V
50%	13.25 V
60%	13.81 V
70%	14.37 V

80%	14.94 V
90%	15.5 V

The generator provides a feedback signal of the generator voltage output through the generator field duty cycle signal circuit to the ECM. This information is sent to the body control module (BCM). The signal is PWM signal of 128 Hz with a duty cycle of 0–100 percent. Normal duty cycle is between 5–99 percent. Between 0–5 percent and 100 percent are for diagnostic purposes.

Battery Sulfation Mode

The BCM will enter this mode when the interpreted generator output voltage is less than 13.2 V for 45 minutes. When this condition exists the BCM will enter Charge Mode for 2–3 minutes. The BCM will then determine which mode to enter depending on voltage requirements.

Charge Mode

The BCM will enter Charge Mode when ever one of the following conditions are met.

- The wipers are ON for more than 3 seconds.
- GMLAN (Climate Control Voltage Boost Mode Request) is true, as sensed by the HVAC control head. High speed cooling fan, rear defogger and HVAC high speed blower operation can cause the BCM to enter the Charge Mode.
- The estimated battery temperature is less than 0°C (32°F).
- Battery State of Charge is less than 80 percent.
- Vehicle speed is greater than 145 km/h (90 mph)
- Current sensor fault exists.
- System voltage was determined to be below 12.56 V

When any one of these conditions is met, the system will set targeted generator output voltage to a charging voltage between 13.9–15.5 V, depending on the battery state of charge and estimated battery temperature.

Fuel Economy Mode

The BCM will enter Fuel Economy Mode when the estimated battery temperature is at least 0°C (32°F) but less than or equal to 80°C (176°F), the calculated battery current is less than 15 amperes and greater than −8 amperes, and the battery state-of-charge is greater than or equal to 80 percent. Its targeted generator output voltage is the open circuit voltage of the battery and can be between 12.5–13.1 V. The BCM will exit this mode and enter Charge Mode when any of the conditions described above are present.

Headlamp Mode

The BCM will enter Headlamp Mode when ever the headlamps are ON (high or low beams). Voltage will be regulated between 13.9–14.5 V.

Start Up Mode

When the engine is started the BCM sets a targeted generator output voltage of 14.5 V for 30 seconds.

Voltage Reduction Mode

The BCM will enter Voltage Reduction Mode when the calculated ambient air temperature is above 0°C (32°F). The calculated battery current is less than 1 ampere and greater than −7 amperes, and the generator field duty cycle is less than 99 percent. Its targeted generator output voltage is 12.9 V. The BCM will exit this mode once the criteria are met for Charge Mode.

Instrument Panel Cluster Operation

Charge Indicator Operation

The instrument panel cluster illuminates the charge indicator and displays a warning message in the driver information center if equipped, when the one or more of the following occurs:

- The engine control module (ECM) detects that the generator output is less than 11 V or greater than 16 V. The instrument panel cluster receives a GMLAN message from the ECM requesting illumination.
- The instrument panel cluster determines that the system voltage is less than 11 V or greater than 16 V for more than 30 seconds. The instrument panel cluster receives a GMLAN message from the body control module (BCM) indicating there is a system voltage range concern.
- The instrument panel cluster performs the displays test at the start of each ignition cycle. The indicator illuminates for approximately 3 seconds.

Display Message: BATTERY NOT CHARGING SERVICE CHARGING SYSTEM or SERVICE BATTERY CHARGING SYSTEM

The BCM and the ECM will send a serial data message to the driver information center for the BATTERY NOT CHARGING SERVICE CHARGING SYSTEM or SERVICE BATTERY CHARGING SYSTEM message to be displayed. It is commanded ON when a charging system DTC is a current DTC. The message is turned OFF when the conditions for clearing the DTC have been met.

Electrical Power Management Description and Operation (Gasoline)

The electrical power management is used to monitor and control the charging system and alert the driver of possible problems within the charging system. The electrical power management system makes the most efficient use of the generator output, improves the battery state-of-charge, extends battery life, and manages system electrical loads.

The load shed operation is a means of reducing electrical loads during a low voltage or low battery state-of-charge condition.

The idle boost operation is a means of improving generator performance during a low voltage or low battery state-of-charge condition.

Each electrical power management function, either idle boost or load shed, is discrete. No two functions are active at the same time. Idle boost is activated in incremental steps, idle boost 1 must be active before idle boost 2 can be active. The criteria used by the body control module (BCM) to regulate electrical power management are outlined below:

Function	Battery Temperature Calculation	Battery Voltage Calculation	Amp-Hour Calculation	Action Taken
Idle Boost 1 Start	Less Than −15°C (5°F)	Less Than 13 V	—	First level Idle boost requested
Idle Boost 1 Start	—	—	Battery has a net loss greater than 0.6 AH	First level Idle boost requested
Idle Boost 1 Start	—	Less Than 10.9 V	—	First level Idle boost requested
Idle Boost 1 End	Greater Than −15°C (5°F)	Greater Than −12 V	Battery has a net loss less than 0.2 AH	First level Idle boost request cancelled
Load Shed 1 Start	—	—	Battery has a net loss of 4 AH	Rear Defrost, Heated Mirrors, Heated Seats cycled OFF for 20% of their cycle
Load Shed 1 Start	—	Less Than 10.9 V	—	Rear Defrost, Heated Mirrors, Heated Seats cycled OFF for 20% of their cycle
Load Shed 1 End	—	Greater Than 12 V	Battery has a net loss of less than 2 AH	Clear Load Shed 1
Idle Boost 2 Start	—	—	Battery has a net loss greater than 1.6 AH	Second level Idle boost requested
Idle Boost 2 Start	—	Less Than 10.9 V	—	Second level Idle boost requested
Idle Boost 2 End	—	Greater Than 12 V	Battery has a net loss less than 0.8 AH	Second level Idle boost request cancelled
Idle Boost 3 Start	—	—	Battery has a net loss of 10.0 AH	Third level Idle boost requested
Idle Boost 3 Start	—	Less Than 10.9 V	—	Third level Idle boost requested
Idle Boost 3 End	—	Greater Than 12 V	Battery has a net loss of less than 6.0 AH	Third level Idle boost request cancelled
Load Shed 2 Start	—	Less Than 10.9 V	Battery has a net loss greater than 12 AH	Rear Defrost, Heated Mirrors, Heated Seats cycled OFF for 50% of their cycle. The BATTERY SAVER ACTIVE message will be displayed on the DIC

Load Shed 2 Start	—	Less Than 10.9 V	—	Rear Defrost, Heated Mirrors, Heated Seats cycled OFF for 50% of their cycle. The BATTERY SAVER ACTIVE message will be displayed on the DIC
Load Shed 2 End	—	Greater Than 12.6 V	Battery has a net loss of less than 10.5 AH	Clear Load Shed 2
Load Shed 3 Start	—	Less Than 11.9 V	Battery has a net loss greater than 20 AH	Rear Defrost, Heated Mirrors, Heated Seats cycled OFF for 100% of their cycle. The BATTERY SAVER ACTIVE message will be displayed on the DIC
Load Shed 3 End	—	Greater Than 12.6 V	Battery has a net loss of less than 15 AH	Clear Load Shed 3

Electrical Power Management Description and Operation (Diesel)

The electrical power management is used to monitor and control the charging system and alert the driver of possible problems within the charging system. The electrical power management system makes the most efficient use of the generator output, improves the battery state-of-charge, extends battery life, and manages system electrical loads.

The load shed operation is a means of reducing electrical loads during a low voltage or low battery state-of-charge condition.

The idle boost operation is a means of improving generator performance during a low voltage or low battery state-of-charge condition. Idle boost consists of three steps: idle boost 1, idle boost 2, and idle boost 3 (approximately 725, 850, and 850 rpm respectively). Idle boost is activated in incremental steps, idle boost 1 must be active before idle boost 2 can be active.

Each electrical power management function, either idle boost or load shed, is discrete. No two functions are active at the same time. The criteria used by the body control module (BCM) to regulate electrical power management are outlined below:

Function	Battery Temperature Calculation	Battery Voltage Calculation	Amp-Hour Calculation	Action Taken
Idle Boost 1 Start	Less Than −15°C (5°F)	Less Than 13 V	—	First level Idle boost requested
Idle Boost 1 Start	—	—	Battery has a net loss greater than 0.6 AH	First level Idle boost requested
Idle Boost 1 Start	—	Less Than 10.9 V	—	First level Idle boost requested
Idle Boost 1 End	Greater Than −15°C (5°F)	Greater Than −12 V	Battery has a net loss less than 0.2 AH	First level Idle boost request cancelled
Load Shed 1 Start	—	—	Battery has a net loss of 4 AH	Rear Defrost, Heated Mirrors, Heated Seats cycled OFF for 20% of their cycle
Load Shed 1 Start	—	Less Than 10.9 V	—	Rear Defrost, Heated Mirrors, Heated Seats cycled OFF for 20% of their cycle
Load Shed 1 End	—	Greater Than 12 V	Battery has a net loss of less than 2 AH	Clear Load Shed 1
Idle Boost 2 Start	—	—	Battery has a net loss greater than 1.6 AH	Second level Idle boost requested
Idle Boost 2 Start	—	Less Than 10.9 V	—	Second level Idle boost requested
Idle Boost 2 End	—	Greater Than 12 V	Battery has a net loss less than 0.8 AH	Second level Idle boost request cancelled
Idle Boost 3 Start	—	—	Battery has a net loss of 10.0 AH	Third level Idle boost requested
Idle Boost 3 Start	—	Less Than 10.9 V	—	Third level Idle boost requested
Idle Boost 3 End	—	Greater Than 12 V	Battery has a net loss of less than 6.0 AH	Third level Idle boost request cancelled
Load Shed 2 Start	—	Less Than 10.9 V	Battery has a net loss greater than 12 AH	Rear Defrost, Heated Mirrors, Heated Seats cycled OFF for 50% of their cycle. The BATTERY SAVER ACTIVE message will be displayed on the DIC

Load Shed 2 Start	—	Less Than 10.9 V	—	Rear Defrost, Heated Mirrors, Heated Seats cycled OFF for 50% of their cycle. The BATTERY SAVER ACTIVE message will be displayed on the DIC
Load Shed 2 End	—	Greater Than 12.6 V	Battery has a net loss of less than 10.5 AH	Clear Load Shed 2
Load Shed 3 Start	—	Less Than 11.9 V	Battery has a net loss greater than 20 AH	Rear Defrost, Heated Mirrors, Heated Seats cycled OFF for 100% of their cycle. The BATTERY SAVER ACTIVE message will be displayed on the DIC
Load Shed 3 End	—	Greater Than 12.6 V	Battery has a net loss of less than 15 AH	Clear Load Shed 3

Starting System Description and Operation

The starter motors are non-repairable starter motors. They have pole pieces that are arranged around the armature. Both solenoid windings are energized. The pull-in winding circuit is completed to the ground through the starter motor. The windings work together magnetically to pull and hold in the plunger. The plunger moves the shift lever. This action causes the starter drive assembly to rotate on the armature shaft spline as it engages with the flywheel ring gear on the engine. Moving at the same time, the plunger also closes the solenoid switch contacts in the starter solenoid. Full battery voltage is applied directly to the starter motor and it cranks the engine.

As soon as the solenoid switch contacts close, current stops flowing thorough the pull-in winding because battery voltage is applied to both ends of the windings. The hold-in winding remains energized. Its magnetic field is strong enough to hold the plunger, shift lever, starter drive assembly, and solenoid switch contacts in place to continue cranking the engine. When the engine starts, pinion overrun protects the armature from excessive speed until the switch is opened.

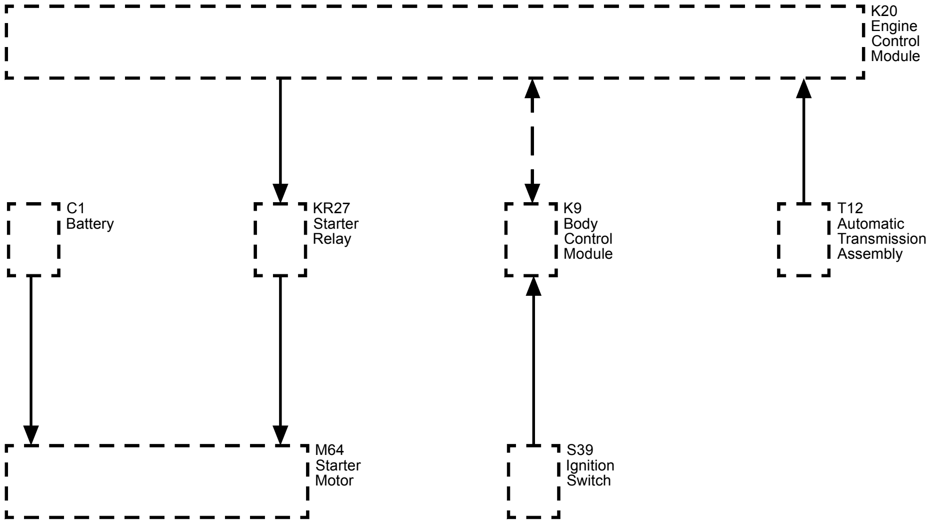
When the ignition switch is released from the START position, the START relay opens and battery voltage is removed from the starter solenoid S terminal. Current flows from the motor contacts through both windings to the ground at the end of the hold-in winding. However, the direction of the current flow through the pull-in winding is now opposite the direction of the current flow when the winding was first energized.

The magnetic fields of the pull-in and hold-in windings now oppose one another. This action of the windings, along with the help of the return spring, causes the starter drive assembly to disengage and the solenoid switch contacts to open simultaneously. As soon as the contacts open, the starter circuit is turned off.

Circuit Description (Key Start)

When the ignition switch is placed in the Start position, a discrete signal is supplied to the body control module (BCM) notifying it that the ignition is in the Start position. The BCM then sends a message to the engine control module (ECM) notifying it that CRANK has been requested. The ECM verifies that the transmission is in Park or Neutral. If it is, the ECM then supplies 12 V to the control circuit of the crank relay. When this occurs, battery positive voltage is supplied through the switch side of the crank relay to the S terminal of the starter solenoid.

Starting System Block Diagram



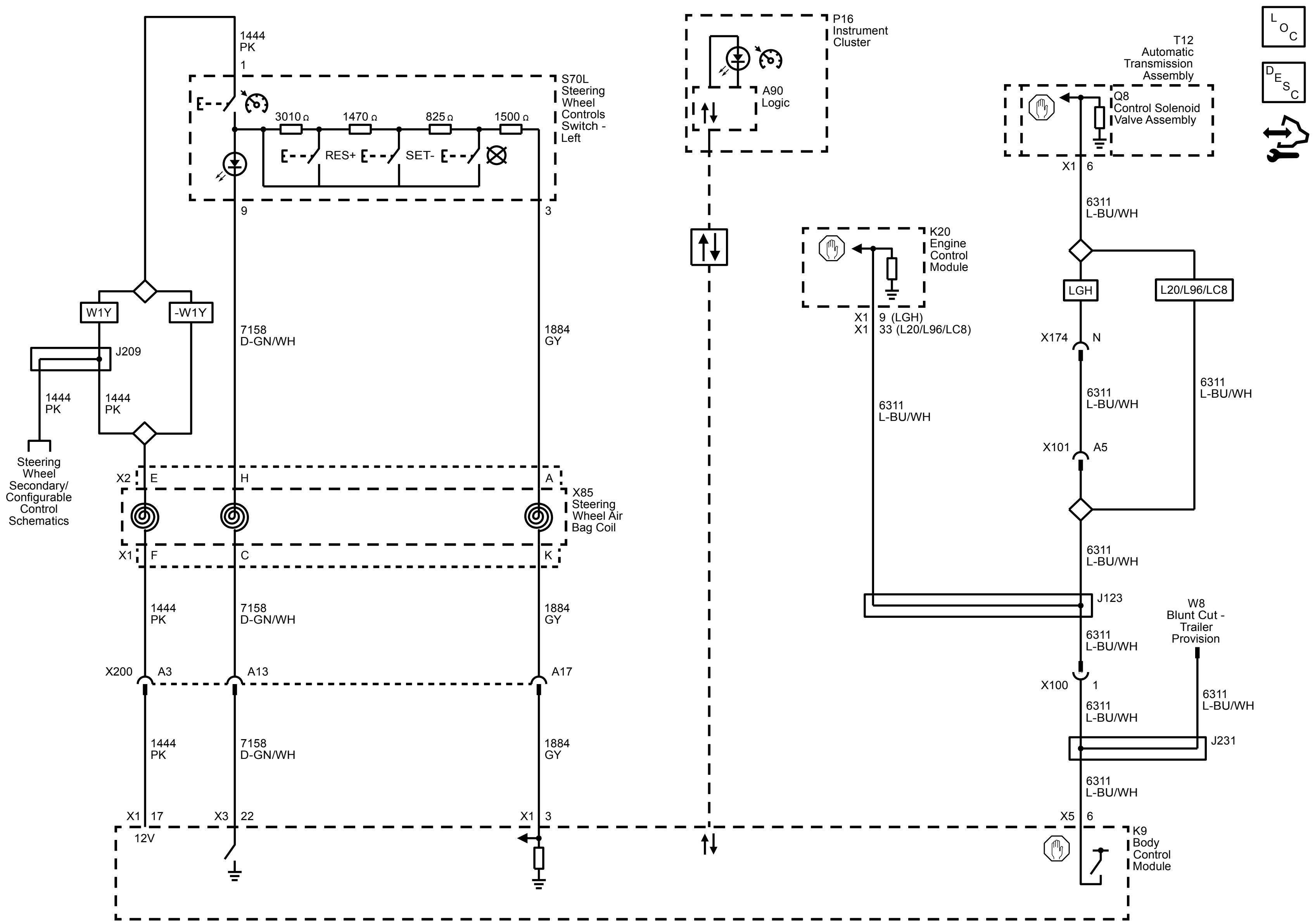
Engine/Propulsion

Cruise Control

Schematic and Routing Diagrams

Cruise Control Schematics

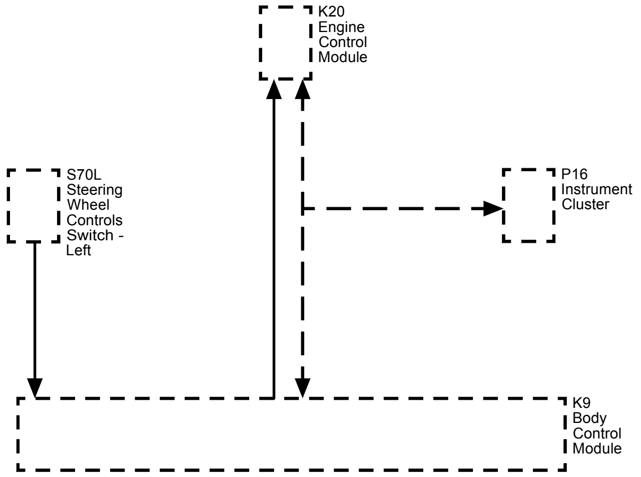
Cruise Control (K34)


1444
PK
1
S70L
Steering
Wheel
Controls
Switch -
Left
3010 Ω
1470 Ω
825 Ω
1500 Ω
RES+
SET-
9
3
W1Y
-W1Y
J209
1444
PK
1444
PK
Steering
Wheel
Secondary/
Configurable
Control
Schematics
7158
D-GN/WH
1884
GY
X2
E
H
A
X85
Steering
Wheel Air
Bag Coil
X1
F
C
K
1444
PK
7158
D-GN/WH
1884
GY
X200
A3
A13
A17
1444
PK
7158
D-GN/WH
1884
GY
X1
17
X3
22
X1
3
12V
P16
Instrument
Cluster
A90
Logic
K20
Engine
Control
Module
X1
9 (LGH)
X1
33 (L20/L96/LC8)
6311
L-BU/WH
T12
Automatic
Transmission
Assembly
Q8
Control Solenoid
Valve Assembly
X1
6
6311
L-BU/WH
LGH
L20/L96/LC8
X174
N
6311
L-BU/WH
6311
L-BU/WH
X101
A5
6311
L-BU/WH
J123
6311
L-BU/WH
W8
Blunt Cut -
Trailer
Provision
X100
1
6311
L-BU/WH
6311
L-BU/WH
J231
6311
L-BU/WH
X5
6
K9
Body
Control
Module
LOC
DESC

Description and Operation

Cruise Control Description and Operation

Cruise Control System Block Diagram



Cruise control is a speed control system that maintains a desired vehicle speed under normal driving conditions at speeds above 40 km/h (25 mph). Steep grades may cause variations in the selected vehicle speeds.

The following are the main components of the Cruise Control System:

- The accelerator pedal
- The brake pedal position (BPP) sensor
- The body control module (BCM)
- The cruise on/off switch
- The cruise control cancel switch
- The + RES switch (equivalent to resume/accelerate switch)
- The − SET switch (equivalent to set/coast switch)
- The engine control module (ECM)
- The throttle actuator control (TAC) motor (gasoline engines only)
- The vehicle speed sensor

The body control module (BCM) monitors the signal circuit of the cruise control switches, which are located on the steering wheel. The BCM relays the cruise control switch status to the engine control module (ECM) via the serial data circuit. The ECM uses the status of the cruise control switch to determine when to capture and maintain the vehicle speed. The ECM monitors the vehicle speed signal circuit in order to determine the desired vehicle speed.

Voltage is supplied to the cruise control switch via the steering wheel control switch reference voltage circuit supplied by the BCM. The cruise control function switches are arranged in a resistive ladder design, with each cruise control function switch having a different resistance value. The BCM detects a specific voltage value that is associated with the cruise control function switch being activated. The BCM sends a serial data message to the ECM indicating that the on/off switch is active. Similarly, when the normally open + RES switch or the normally open − SET switch are pressed, the switch closes and the BCM detects the predetermined voltage signal on the cruise control resume/accel and set/coast switch signal circuit. The BCM sends a serial data message to the ECM indicating that the + RES switch or the − SET switch is active.

Cruise Control Engaged

The Cruise Control System will engage and adjust vehicle speeds, based on the activation of the following cruise control switches, which are located on the steering wheel:

- On/Off

- + RES
- − SET

To engage the Cruise Control System, ensure that the vehicle speed is above 40.2 km/h (25 mph), turn the cruise On/Off switch ON and momentarily press the − SET switch. The ECM will engage the Cruise Control System and record the vehicle speed. The ECM sends a serial data message to the instrument panel cluster (IPC) in order to illuminate the Cruise Engaged indicator in the IPC. Refer to the vehicle owner’s manual for the location and operation of the cruise control On/Off indicators and driver information center (DIC) messages.

Pressing the accelerator pedal while the Cruise Control System is engaged, allows the driver to override the Cruise Control System in order to accelerate the vehicle beyond the current set vehicle speed. When the accelerator pedal is released, the vehicle will decelerate and resume the current set vehicle speed.

The driver can also override the current set vehicle speed via the − SET switch and the + RES switch. When the Cruise Control System is engaged, pressing and holding the − SET switch will allow the vehicle to decelerate from the current set vehicle speed without deactivating the Cruise Control System. When the − SET switch is released, the ECM will record the vehicle speed and maintain the vehicle speed as the new set vehicle speed. When the Cruise Control System is engaged, momentarily pressing the − SET switch will allow the vehicle to decelerate at a vehicle specific calibratable increment, commonly 1.6 km/h (1 mph), each time that the − SET is momentarily pressed, with a minimum vehicle speed of 38 km/h (24 mph). Refer to the vehicle Owner’s Manual for more information.

Pressing and holding the + RES switch, when the Cruise Control System is engaged, will allow the vehicle to accelerate to a greater vehicle speed than the current set vehicle speed. When the + RES switch is released, the ECM will record the vehicle speed and maintain the vehicle speed as the new set vehicle speed. When the Cruise Control System is engaged, momentarily pressing the + RES switch will allow the vehicle to accelerate at a vehicle specific calibratable increment, commonly 1.6 km/h (1 mph), each time that the + RES switch is momentarily pressed. Momentarily activating the + RES switch will recall the previous vehicle speed, after the cruise control system has been disengaged by pressing the brake pedal, or CANCEL switch. Refer to the vehicle Owner’s Manual for more information.

Cruise Control Disengaged

The engine control module (ECM) disengages the cruise control operation based on the signals from the following switches:

- The brake pedal position (BPP) sensor
- The On/Off switch
- The cruise control cancel switch

The Cruise Control System will disengage when the brake pedal is applied. The body control module (BCM) monitors the BPP sensor via the BPP sensor signal circuit as the voltage signal increases while the pedal is further applied. The ECM monitors the BPP signal through a discrete input and a serial data message signal from the BCM indicating the brake status. When either signal indicates the brake pedal is applied, the ECM will disengage the cruise control system.

The Cruise Control System will also disengage when the cruise control on/off switch is switched OFF, or the cruise control cancel switch is activated. The body control module (BCM) determines when the cruise control cancel switch is activated. When the normally open cancel switch is closed, the BCM detects the predetermined voltage signal on the cruise control function switch circuit. The vehicle speed stored in the memory of the engine control module will be erased when the cruise control On/Off switch is turned OFF, or the ignition switch is turned OFF. The BCM sends a serial data message to the ECM in order to disengage the cruise control system. When the Cruise Control System has been disengaged, the ECM sends a serial message to the instrument panel cluster (IPC) in order to turn OFF the Cruise Engaged indicator.

Every time the Cruise Control System is disengaged, the ECM will keep track of the reason for system disengagement. The last 8 disengagement reasons will be recorded within the ECM memory. The scan tool will display the last 8 Cruise Disengage History parameters, in which one out of approximately 50 possible reasons will be displayed in each of these 8 parameters. For the disengagement reason to be displayed within the scan tool parameter the Cruise Control System is active and disengagement is requested.

When engagement of the system is requested but an engagement inhibit is present, the most recent inhibit reason is recorded in the ECM history. The scan tool will display the most recent inhibit reason, in which one out of approximately 50 possible reasons will be displayed.

Cruise Control Inhibited

The engine control module (ECM) inhibits the cruise control operation when any of the following conditions exist:

- The ECM has not detected a brake pedal activation from the body control module (BCM) this ignition cycle.
- A Cruise Control System DTC has been set.
- The vehicle speed is less than 38.6 km/h (24 mph).
- The vehicle speed is too high.
- The vehicle is in PARK, REVERSE, NEUTRAL, or 1st gear.
- The engine RPM is low.
- The engine RPM is high.
- The system voltage is not between 9 volts and 16 volts.
- The Antilock Brake System (ABS)/Traction Control System (TCS) is active for more than a calibratable time (typically 0.3 to 0.7 seconds).

Cruise Control Inhibit Reasons

This is a general list of inhibit reasons. Not every inhibit reason is applicable to all vehicles. Refer to the scan tool inhibit reason list for the last 8 reasons that have been recorded during the current ignition cycle.

Scan Tool Name	Description	Long Description
ACC BRAKE INOP	Adaptive Cruise Control Automatic Braking Failed	Adaptive Cruise Control Automatic Braking Inoperative

ACC DATA	Serial data fault for Adaptive Cruise Control Throttle Control and Brake Control signals sent by Adaptive Cruise Control module	Adaptive Cruise Control Module serial data fault is active or communication has been lost between ACC module and ECM.
ACC INHIBIT	Adaptive Cruise Control Inhibited	Adaptive Cruise Control Inhibited
ACC OPTION	Adaptive Cruise Control option mismatch	Cruise control type (adaptive cruise or conventional cruise) mismatched between ECM and BCM.
ACCEL RATE	High acceleration	Vehicle acceleration rate is too high.
ACCEL Time	Rate Limiting Fault	Cruise torque request rate limiting active too long
APP OVERRIDE	Pedal greater than cruise (override)	Driver has overridden cruise control set speed with accelerator pedal for greater than an allowable time.
Auto Brk Data	Automatic Braking Engine Torque Request Signal Communication Malfunction	ECM to EBCM serial data fault is active or communication has been lost between ECM and EBCM.
AXLE RANGE	Rear Axle Low	Rear axle in low range
BPP DATA	DTC P0703 active or maximum time elapsed without receiving valid Brake Pedal Position signal.	Serial data fault is active or communication has been lost with module sending brake pedal apply state
BPP DTC	Brake Pedal Position signal invalid	Brake Pedal Apply Circuit fault has been detected.
BPP Not Learned	Brake Apply Sensor Home Position Not Learned	Brake Pedal Position Sensor Released Position Not Learned.
BRAKE	Brake pedal apply	Brake Pedal was applied.
Brk Ped Press	Brake Pedal Driver Applied Pressure Detected	A Brake Pedal Apply has been detected based on brake pedal pressure as measured by the EBCM.
Calc Eng Torque	Calculated Torque	Engine torque calculation is incorrect.
CANCEL	Cancel switch active	Cancel Switch was depressed.
CLUTCH	Clutch switch active	Clutch Pedal was applied.
COAST DISENGAGE	Coast disengage	Cruise control is in coast mode with the Set/Coast switch depressed and is requesting no throttle
COAST SPEED LOW	Coast below low speed inhibit	Set / Coast switch was depressed. Vehicle slowed below minimum cruise operating speed.
Cruise Brk Inop	Brake System Malfunction	EBCM has detected a failure that does not allow automatic braking to be performed.
CRUISE S/W	Sequence of completion checks	Cruise control software execution error has occurred.
CRUISE SW DATA	Serial data fault (Cruise switch serial communication fault)	Cruise switch serial data fault is active or communication has been lost with module sending cruise switch states
CRUISE SW. OFF	On/Off switch in Off state	Cruise On/Off switch turned Off
DECEL RATE	High deceleration	Vehicle deceleration rate is too high.
DLC OVERRIDE	ALDL	Scan Tool plugged into ALDL connector

DTC SET	Malfunction in PCM/ECM (DTC active)	DTC is active or in history that inhibits cruise control operation.
D WHL SPD HI	Driven Whl Spd Greater (wheel slip detection)	Driven wheel speed greater than Non Driven wheel speed (slip detection)
D WHL SPD LOW	Un-driven Whl speed Greater	Non Driven wheel speed greater than driven wheel speed
ECM INHIBIT	PCM/ECM inhibit (RAM corruption)	ECM internal communication error
ECM RESET	ECM Running Reset	ECM Running Reset occurred
ECT OVERTEMP	Engine metal overtemp active	Engine over temperature. Overheated.
ENG RUN TIME	Engine run time not elapsed	Engine has not been running long enough, typically five seconds.
ENGINE SPEED	Engine speed too low or too high	Engine RPM too low (near stall) or too high (near engine RPM fuel shutoff).
FIRST GEAR	1st Gear	Transmission is engaged in 1st gear
HIGH SPEED	Vehicle speed exceeds high speed threshold	Vehicle speed has exceeded maximum cruise operating speed
HIGH VOLTAGE	Voltage above high voltage threshold	Ignition Voltage High at ECM (typically 18 volts)
ILLEGAL MODE	Illegal cruise mode	Cruise control mode is incorrect based on switch states.
LOST FWD GEAR	Transmission in neutral. Reverse or park	Gear selector not in forward gear
LOW SPEED	Vehicle speed drops below low speed threshold	Vehicle speed dropped below the cruise control minimum operating speed. May be due to hilly terrain and low vehicle speed. Manual transmission gear selection and engine torque may contribute to this disengagement reason.
LOW VOLTAGE	Voltage below low voltage threshold	Ignition Voltage Low at ECM (typically 9 volts)
MEMORY DTC	Memory Failure	Control module memory failure detected.
MPH LIMIT	MPH Limited Fuel (Vehicle overspeed fuel cut-off active)	Vehicle overspeed protection active with fuel cut off active
M/T Gear Changed	Manual transmission out of gear with no clutch pedal apply	Manual transmission shifted to Neutral without clutch pedal being applied.
NONE	None	This disengagement reason may be displayed after a dead battery repair or module replacement.
OVER SET SPEED	Over schedule	Vehicle speed has exceeded driver selected set speed by more than an allowable amount. This may occur while driving down a significant grade or driver overriding cruise while performing a passing maneuver.
PARK BRAKE	Park Brake Switch signal Active	Parking Brake Applied

PEDAL INITIALIZE	Brake before cruise	The brake pedal has not been seen as applied prior to driver request to engage cruise with set switch. A brake pedal apply must be seen before allowing cruise engagement during each key cycle. On a vehicle equipped with a manual transmission, a clutch pedal apply may satisfy the brake pedal apply criteria.
PTO ACTIVE	Power Take Off Active	Power Take Off is active.
Ram DTC	Processor Integrity Fault (Ram corruption)	ECM software error has occurred
RPM LIMIT	Injectors Disabled (Engine overspeed fuel cut-off active)	Engine RPM limiter active with fuel cut off active.
S/C ON SPEED HI	Over schedule tap-down	Set/Coast switch selected, vehicle speed is above set speed and does not decrease. May be due to traveling down hill
SIMUL S/C-R/A	SET and RESUME switches simultaneously active	Set/Coast and Resume Accelerate switches pressed simultaneously
SL/W Sys On	Speed Limiter / Warning On/Off switch turned on	Driver has turned on the Speed Limiter/Warning on/off switch. Cruise is disabled / inhibited and cruise on/off switch will be set to OFF.
SW. INVALID	Analog cruise switch input out of range	Cruise switch voltage signal in invalid range
TAC INHIBIT	ETC prevents cruise operation	Electronic Throttle Control has detected a failure in the throttle control hardware
TCS	Traction control active	Traction Control was Active
TRANS DTC	Trans Gear Fault	Transmission DTC is active or in history that inhibits cruise control operation
UNDER SET SPEED	Under schedule	Vehicle speed is below cruise control set speed by more than an allowable amount
VSES	Vehicle stability active	Vehicle Stability Control was active
4WD Low	4WD Low	Transfer case in low range

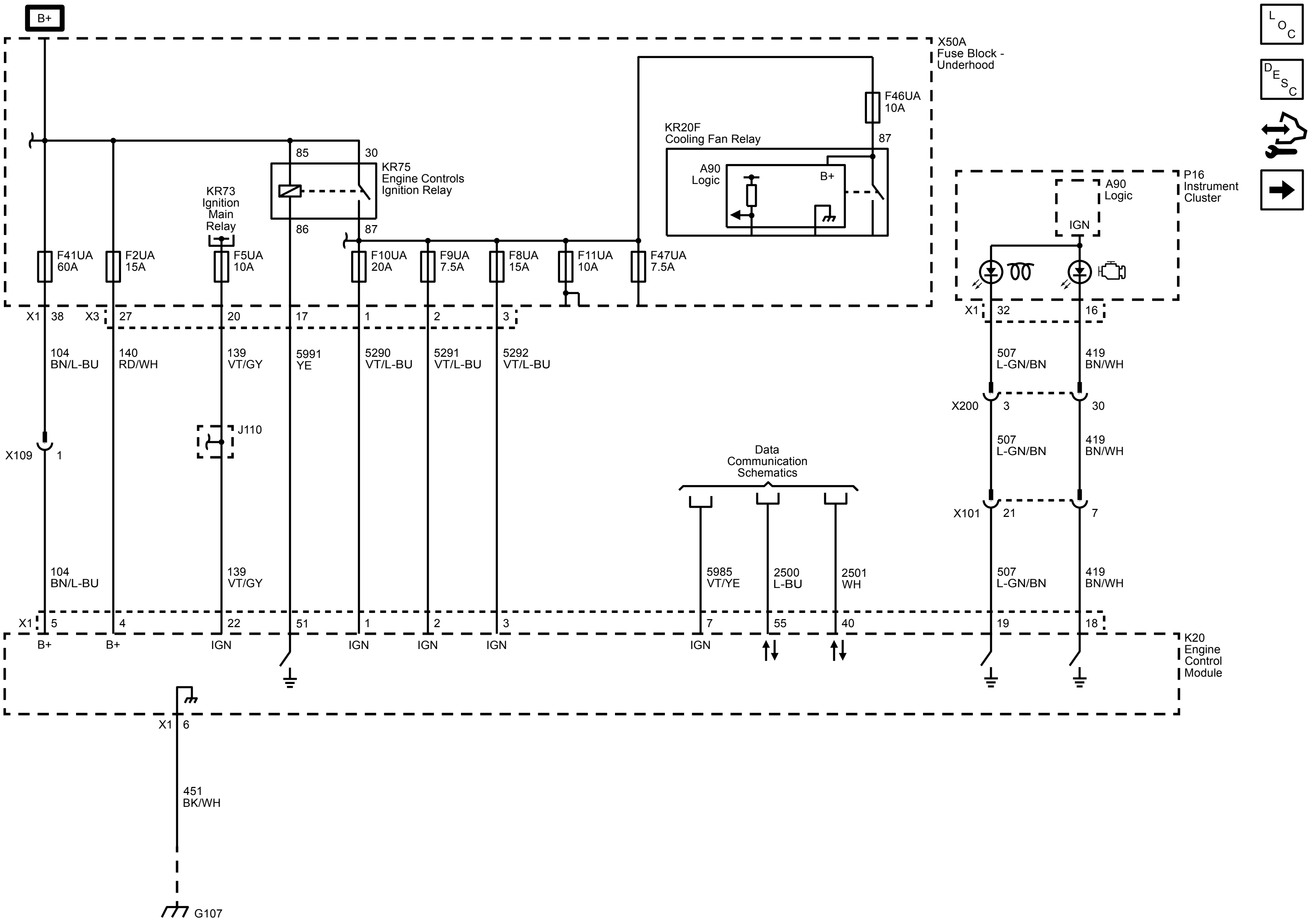
Engine/Propulsion

Engine Controls and Fuel - 2.8L (LWN) Diesel

Schematic and Routing Diagrams

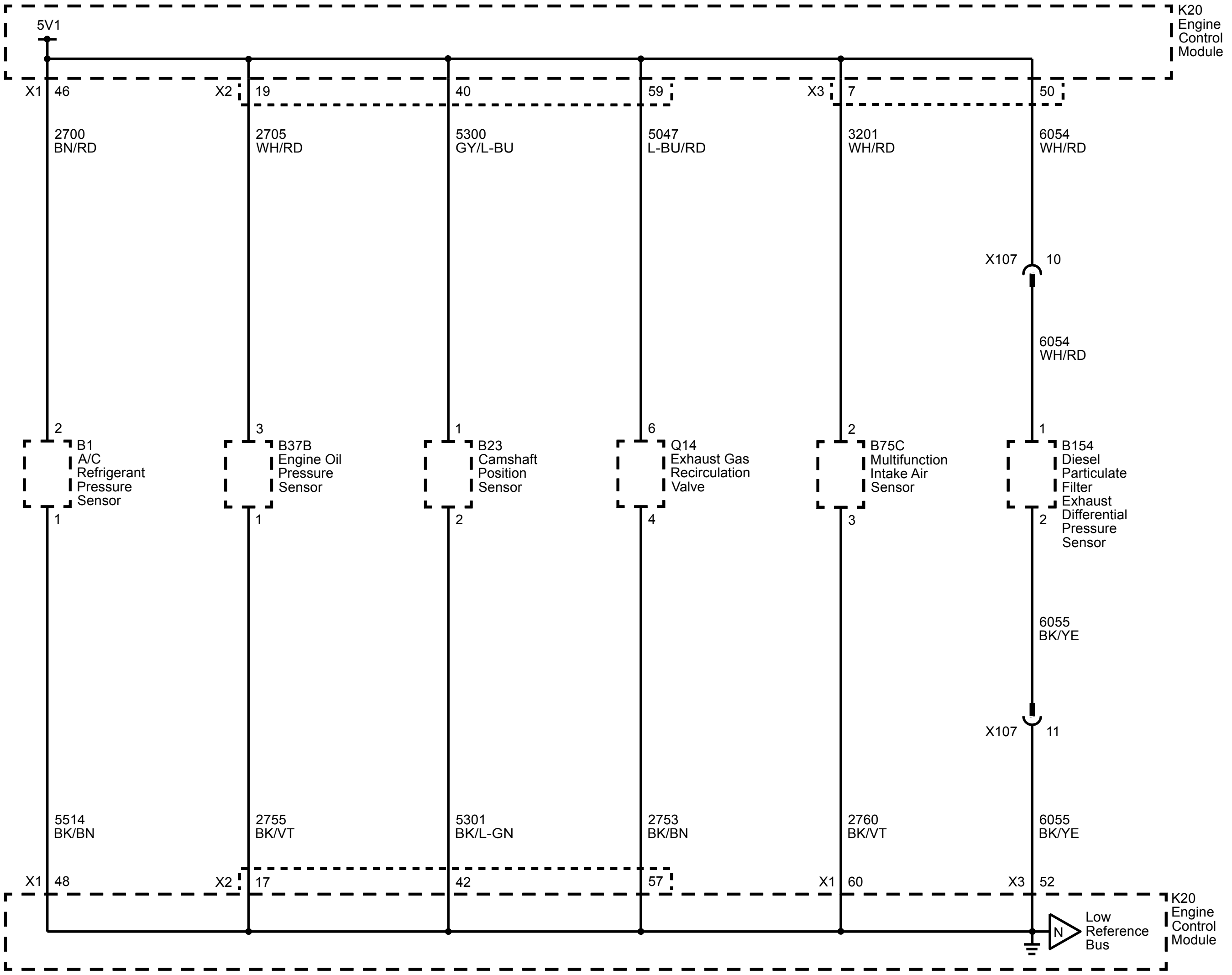
Engine Controls Schematics

Power, Ground, Serial Data, and MIL

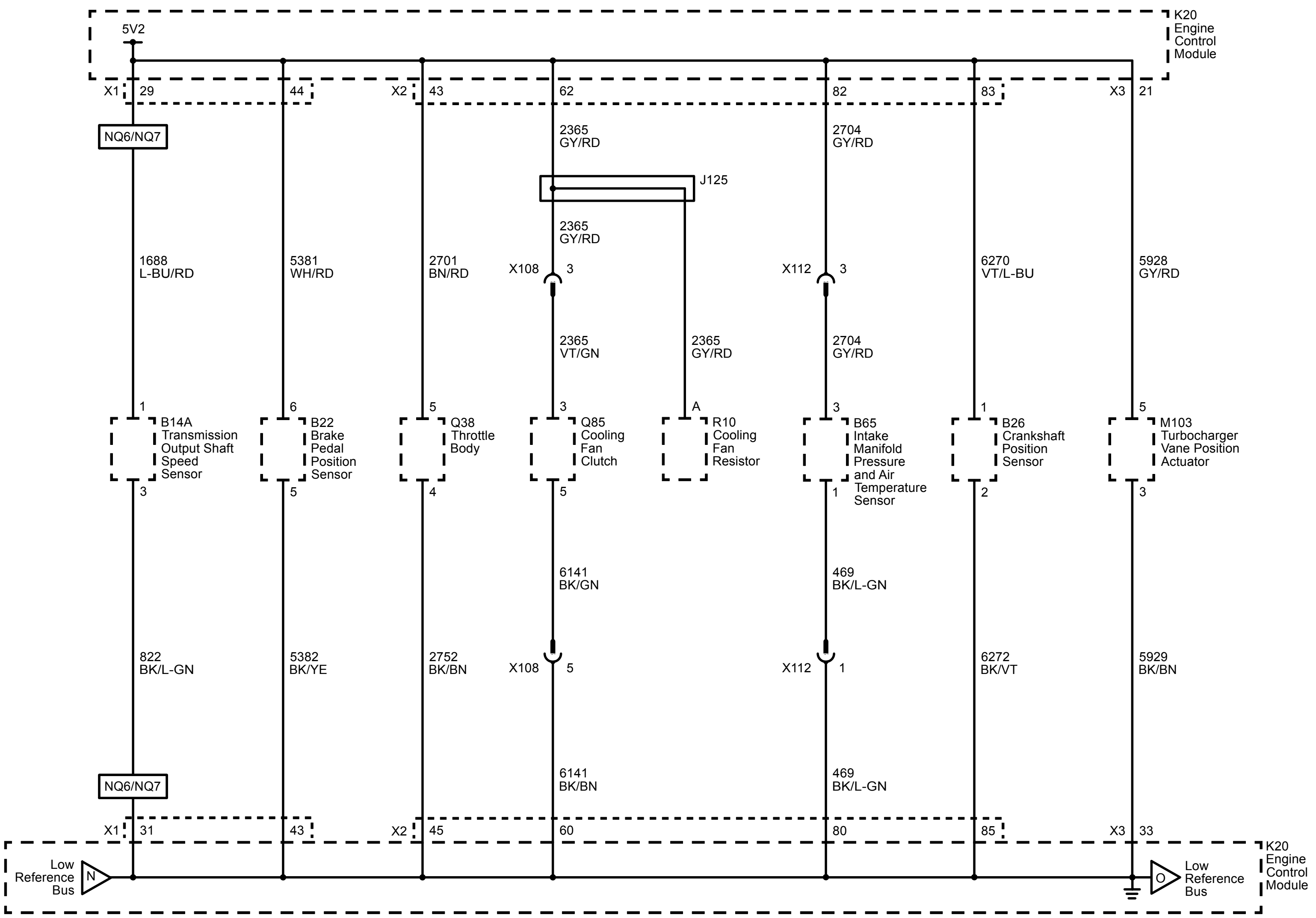

B+
X50A
Fuse Block -
Underhood
F46UA
10A
KR20F
Cooling Fan Relay
87
A90
Logic
B+
85
30
KR75
Engine Controls
Ignition Relay
86
87
KR73
Ignition
Main
Relay
F41UA
60A
F2UA
15A
F5UA
10A
F10UA
20A
F9UA
7.5A
F8UA
15A
F11UA
10A
F47UA
7.5A
X1
38
X3
27
20
17
1
2
3
104
BN/L-BU
140
RD/WH
139
VT/GY
5991
YE
5290
VT/L-BU
5291
VT/L-BU
5292
VT/L-BU
J110
X109
1
104
BN/L-BU
139
VT/GY
Data
Communication
Schematics
5985
VT/YE
2500
L-BU
2501
WH
P16
Instrument
Cluster
A90
Logic
IGN
X1
32
16
507
L-GN/BN
419
BN/WH
X200
3
30
507
L-GN/BN
419
BN/WH
X101
21
7
507
L-GN/BN
419
BN/WH
X1
5
4
22
51
1
2
3
7
55
40
19
18
B+
B+
IGN
IGN
IGN
IGN
IGN
K20
Engine
Control
Module
X1
6
451
BK/WH
G107
L
O
C
D
E
S
C

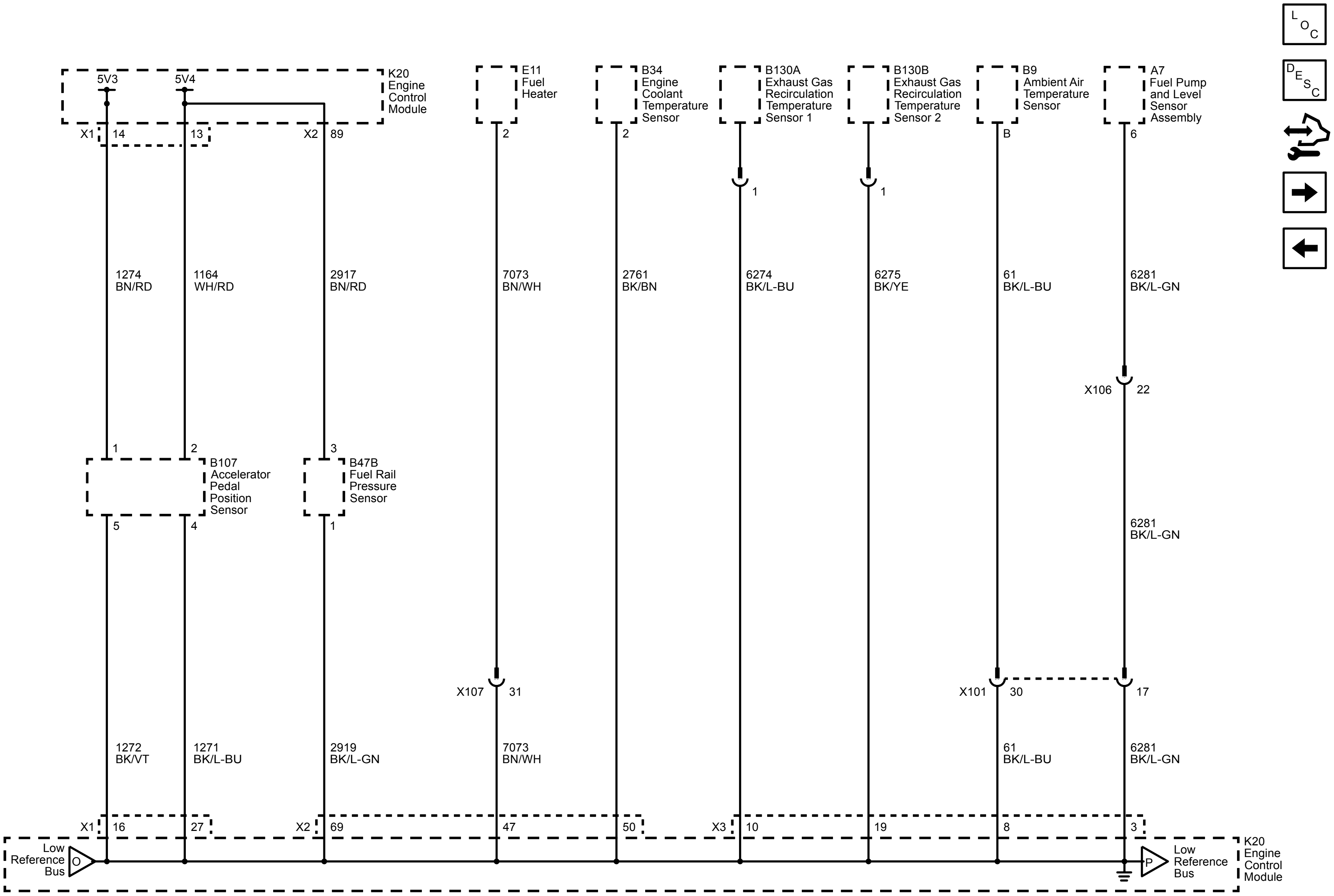
5V1, and Low Reference Bus (1 of 4)

LOC
DESC


K20
Engine
Control
Module
5V1
X1 46
2700
BN/RD
X2 19
2705
WH/RD
40
5300
GY/L-BU
59
5047
L-BU/RD
X3 7
3201
WH/RD
50
6054
WH/RD
X107 10
6054
WH/RD
2
B1
A/C
Refrigerant
Pressure
Sensor
1
3
B37B
Engine Oil
Pressure
Sensor
1
1
B23
Camshaft
Position
Sensor
2
6
Q14
Exhaust Gas
Recirculation
Valve
4
2
B75C
Multifunction
Intake Air
Sensor
3
1
B154
Diesel
Particulate
Filter
Exhaust
Differential
Pressure
Sensor
2
6055
BK/YE
X107 11
5514
BK/BN
2755
BK/VT
5301
BK/L-GN
2753
BK/BN
2760
BK/VT
6055
BK/YE
X1 48
X2 17
42
57
X1 60
X3 52
N
Low
Reference
Bus
K20
Engine
Control
Module

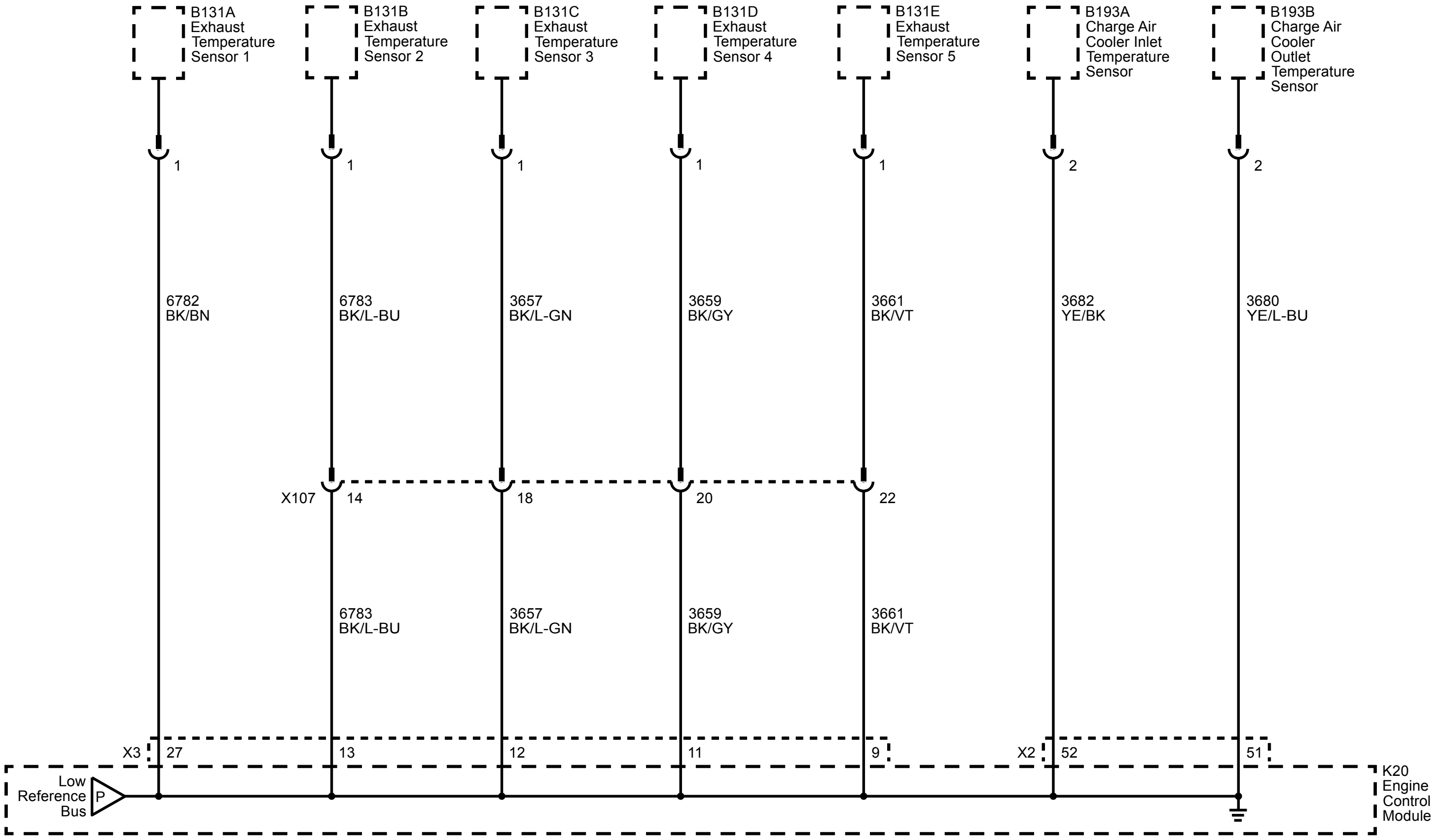
5V2, and Low Reference Bus (2 of 4)


K20 Engine Control Module
5V2
X1 29
44
X2 43
62
82
83
X3 21
NQ6/NQ7
1688 L-BU/RD
5381 WH/RD
2701 BN/RD
2365 GY/RD
J125
2365 GY/RD
X108 3
2365 VT/GN
2365 GY/RD
2704 GY/RD
X112 3
2704 GY/RD
6270 VT/L-BU
5928 GY/RD
1 B14A Transmission Output Shaft Speed Sensor 3
6 B22 Brake Pedal Position Sensor 5
5 Q38 Throttle Body 4
3 Q85 Cooling Fan Clutch 5
A R10 Cooling Fan Resistor
3 B65 Intake Manifold Pressure and Air Temperature Sensor 1
1 B26 Crankshaft Position Sensor 2
5 M103 Turbocharger Vane Position Actuator 3
6141 BK/GN
469 BK/L-GN
822 BK/L-GN
5382 BK/YE
2752 BK/BN
X108 5
X112 1
6272 BK/VT
5929 BK/BN
6141 BK/BN
469 BK/L-GN
NQ6/NQ7
X1 31
43
X2 45
60
80
85
X3 33
Low Reference Bus N
O Low Reference Bus
K20 Engine Control Module



LOC
DESC
5V3
5V4
K20 Engine Control Module
X1 14 13
X2 89
E11 Fuel Heater
2
B34 Engine Coolant Temperature Sensor
2
B130A Exhaust Gas Recirculation Temperature Sensor 1
1
B130B Exhaust Gas Recirculation Temperature Sensor 2
1
B9 Ambient Air Temperature Sensor
B
A7 Fuel Pump and Level Sensor Assembly
6
1274 BN/RD
1164 WH/RD
2917 BN/RD
7073 BN/WH
2761 BK/BN
6274 BK/L-BU
6275 BK/YE
61 BK/L-BU
6281 BK/L-GN
X106 22
1 2 3
B107 Accelerator Pedal Position Sensor
B47B Fuel Rail Pressure Sensor
5 4 1
6281 BK/L-GN
X107 31
X101 30
17
1272 BK/VT
1271 BK/L-BU
2919 BK/L-GN
7073 BN/WH
61 BK/L-BU
6281 BK/L-GN
X1 16 27
X2 69 47 50
X3 10 19 8 3
Low Reference Bus
O
P
Low Reference Bus
K20 Engine Control Module

Low Reference Bus (4 of 4)


B131A
Exhaust Temperature Sensor 1
B131B
Exhaust Temperature Sensor 2
B131C
Exhaust Temperature Sensor 3
B131D
Exhaust Temperature Sensor 4
B131E
Exhaust Temperature Sensor 5
B193A
Charge Air Cooler Inlet Temperature Sensor
B193B
Charge Air Cooler Outlet Temperature Sensor
1
1
1
1
1
2
2
6782
BK/BN
6783
BK/L-BU
3657
BK/L-GN
3659
BK/GY
3661
BK/VT
3682
YE/BK
3680
YE/L-BU
X107
14
18
20
22
6783
BK/L-BU
3657
BK/L-GN
3659
BK/GY
3661
BK/VT
X3
27
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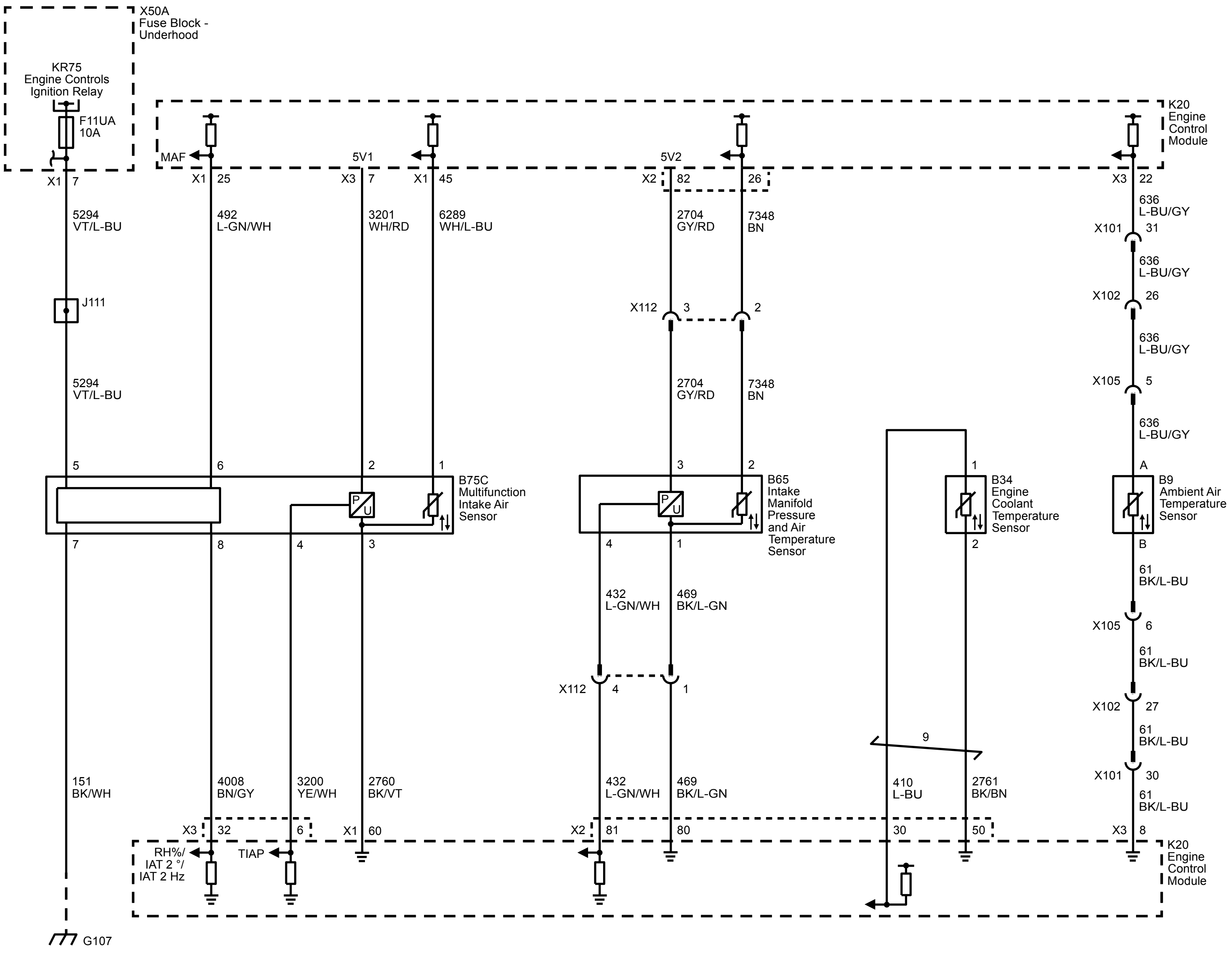
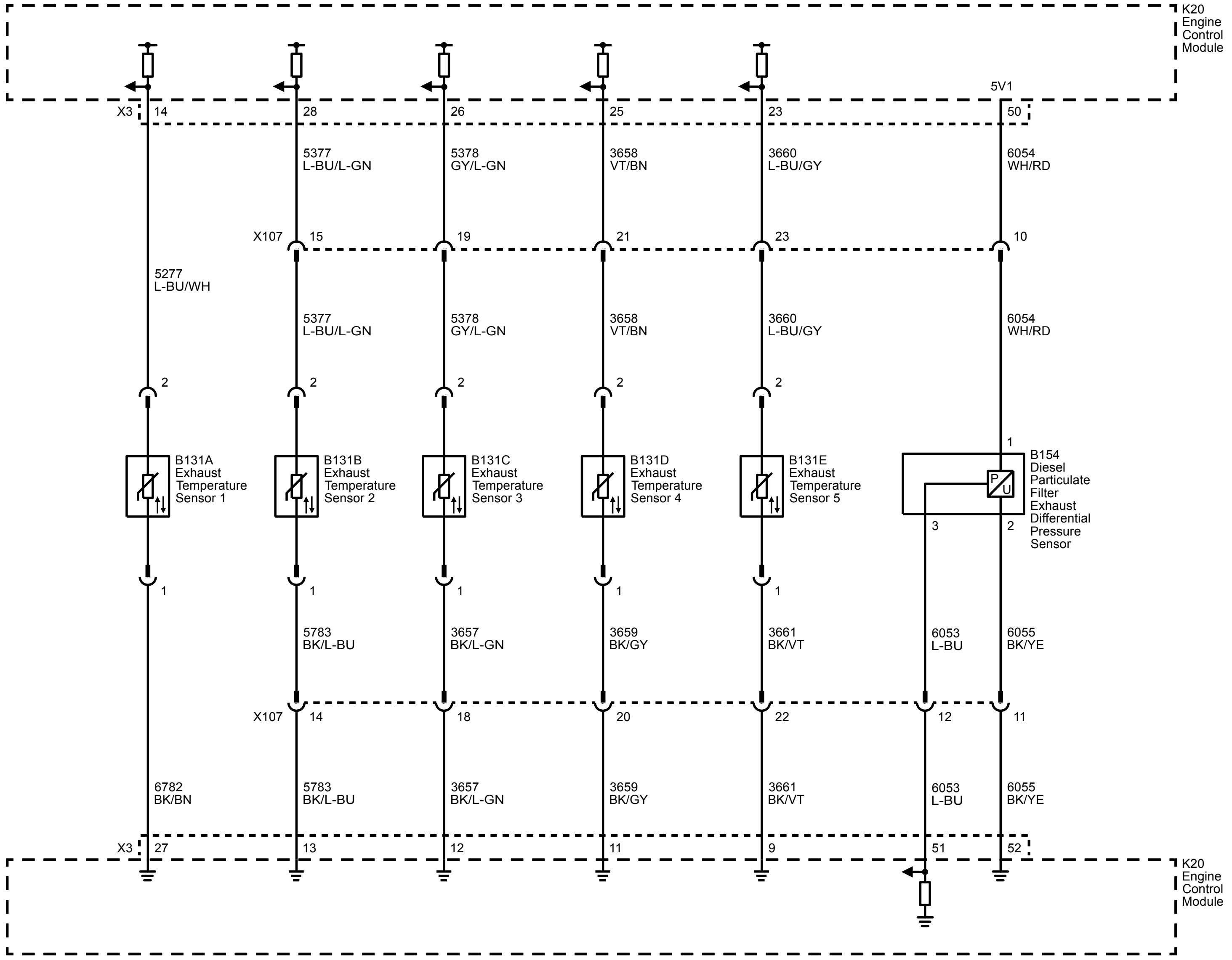
9
X2
52
51
Low Reference Bus
P
K20
Engine Control Module

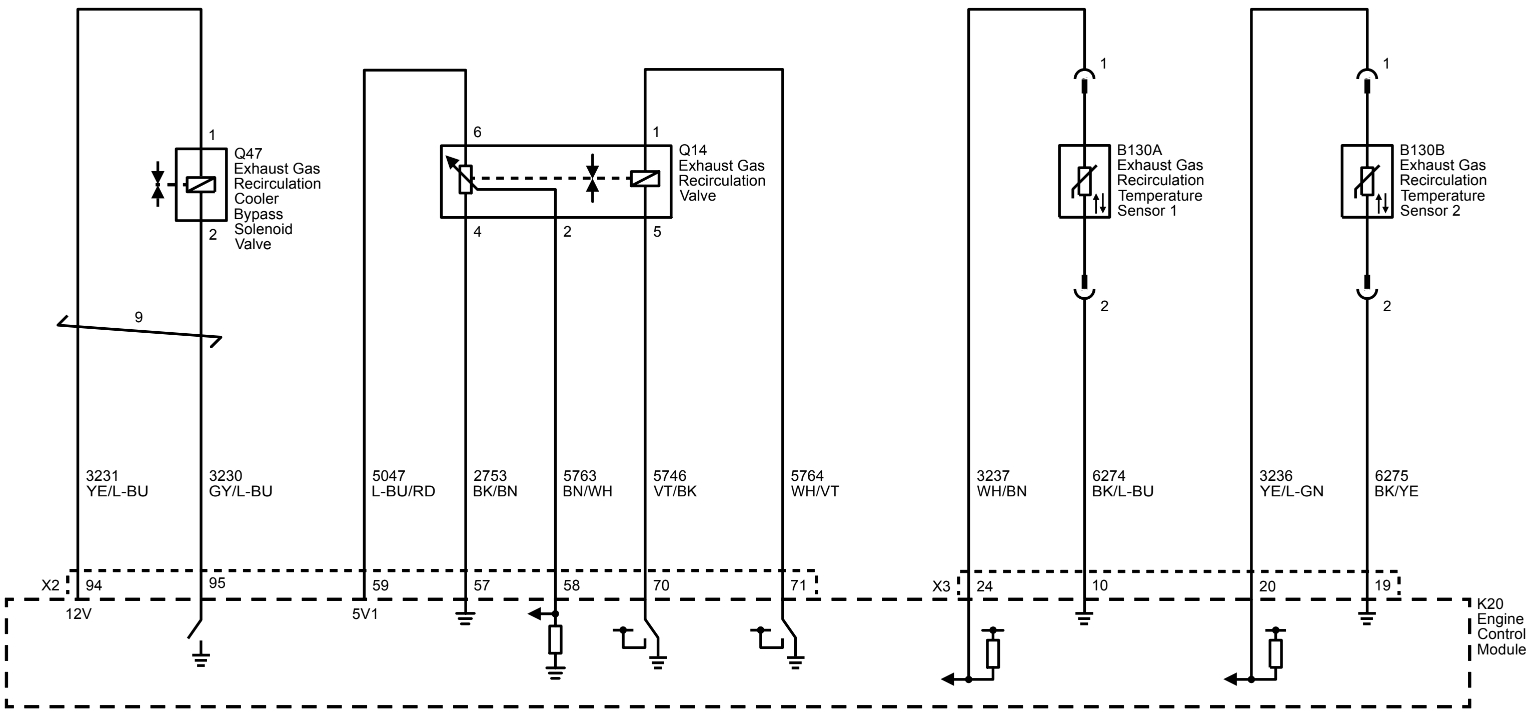
Engine Data Sensors - Pressure and Temperature (1 of 2)


X50A
Fuse Block -
Underhood
KR75
Engine Controls
Ignition Relay
F11UA
10A
X1 7
5294
VT/L-BU
J111
5294
VT/L-BU
K20
Engine
Control
Module
MAF
X1 25
492
L-GN/WH
5V1
X3 7
3201
WH/RD
X1 45
6289
WH/L-BU
5V2
X2 82
2704
GY/RD
26
7348
BN
X112 3
2
2704
GY/RD
7348
BN
X3 22
636
L-BU/GY
X101 31
636
L-BU/GY
X102 26
636
L-BU/GY
X105 5
636
L-BU/GY
5
6
2
1
B75C
Multifunction
Intake Air
Sensor
P
U
7
8
4
3
3
2
B65
Intake
Manifold
Pressure
and Air
Temperature
Sensor
4
1
432
L-GN/WH
469
BK/L-GN
X112 4
1
1
B34
Engine
Coolant
Temperature
Sensor
2
A
B9
Ambient Air
Temperature
Sensor
B
61
BK/L-BU
X105 6
61
BK/L-BU
X102 27
61
BK/L-BU
X101 30
61
BK/L-BU
9
151
BK/WH
4008
BN/GY
3200
YE/WH
2760
BK/VT
432
L-GN/WH
469
BK/L-GN
410
L-BU
2761
BK/BN
X3 32
6
X1 60
X2 81
80
30
50
X3 8
RH%/
IAT 2 °/
IAT 2 Hz
TIAP
K20
Engine
Control
Module
G107

Engine Data Sensors - Pressure and Temperature (2 of 2)

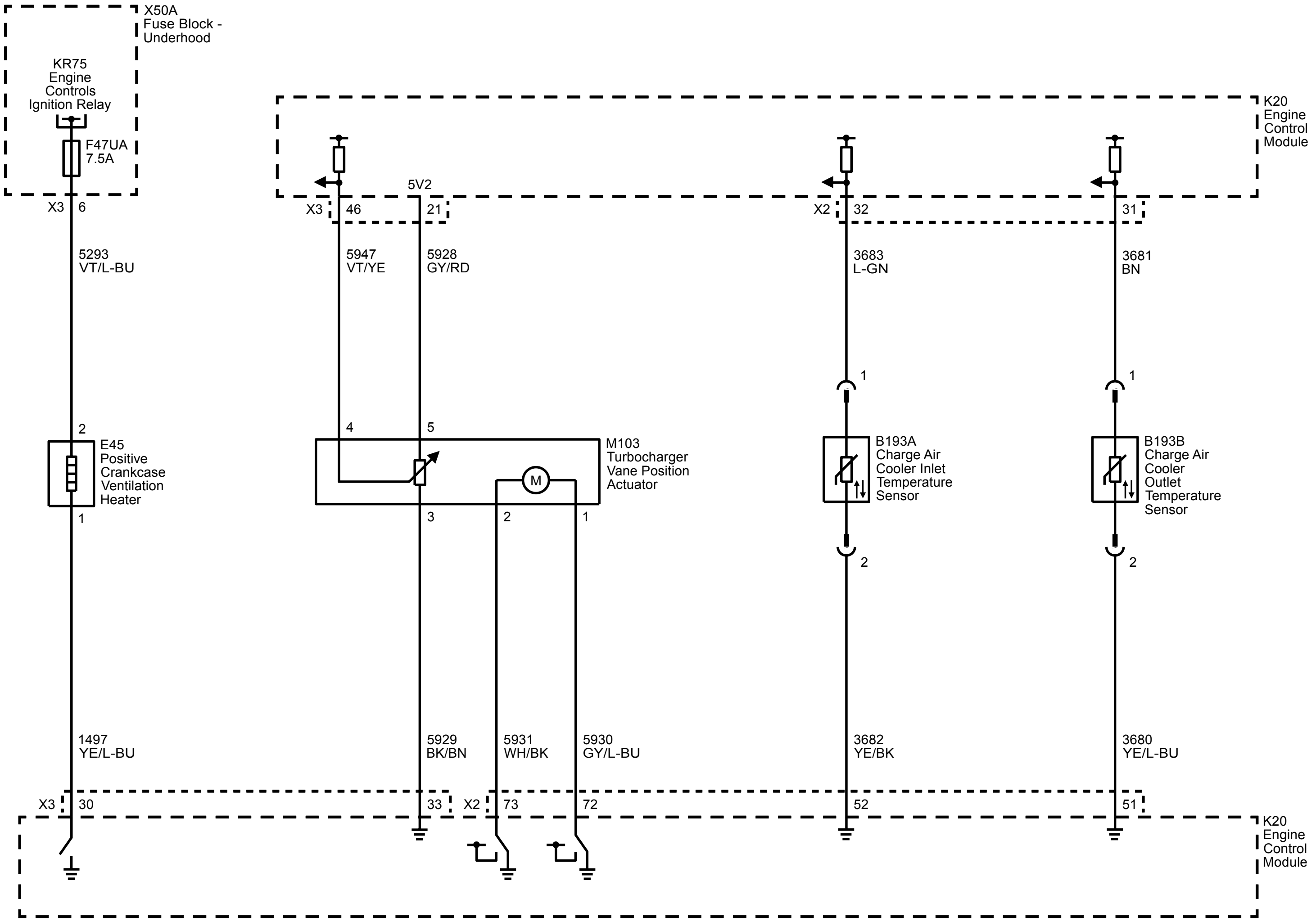

K20 Engine Control Module
5V1
X3
14
28
26
25
23
50
5277 L-BU/WH
5377 L-BU/L-GN
5378 GY/L-GN
3658 VT/BN
3660 L-BU/GY
6054 WH/RD
X107
15
19
21
23
10
5377 L-BU/L-GN
5378 GY/L-GN
3658 VT/BN
3660 L-BU/GY
6054 WH/RD
2
2
2
2
2
1
B131A Exhaust Temperature Sensor 1
B131B Exhaust Temperature Sensor 2
B131C Exhaust Temperature Sensor 3
B131D Exhaust Temperature Sensor 4
B131E Exhaust Temperature Sensor 5
B154 Diesel Particulate Filter Exhaust Differential Pressure Sensor
P
U
3
2
1
1
1
1
1
5783 BK/L-BU
3657 BK/L-GN
3659 BK/GY
3661 BK/VT
6053 L-BU
6055 BK/YE
X107
14
18
20
22
12
11
6782 BK/BN
5783 BK/L-BU
3657 BK/L-GN
3659 BK/GY
3661 BK/VT
6053 L-BU
6055 BK/YE
X3
27
13
12
11
9
51
52
K20 Engine Control Module

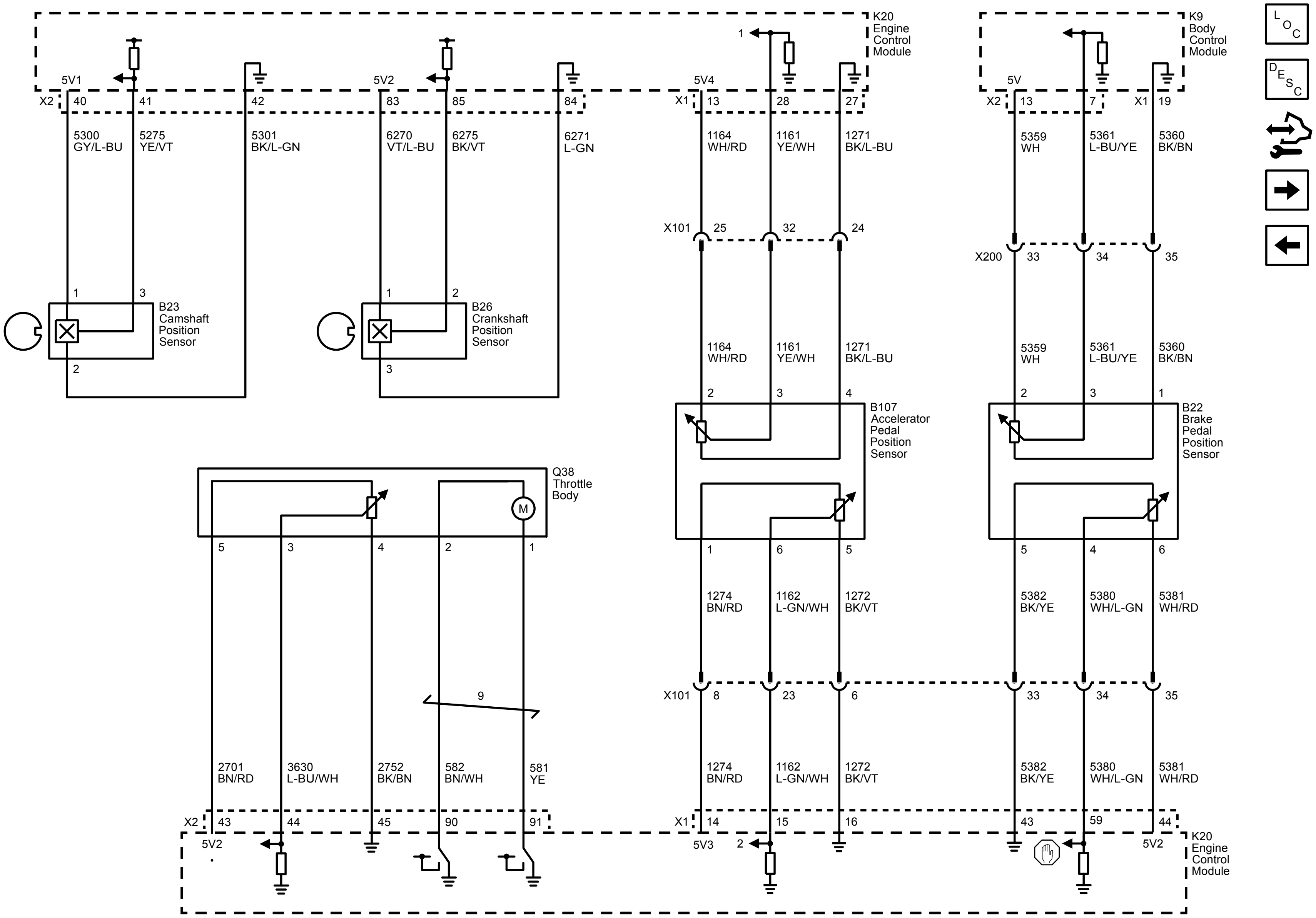
Engine Data Sensors - Exhaust Gas Recirculation

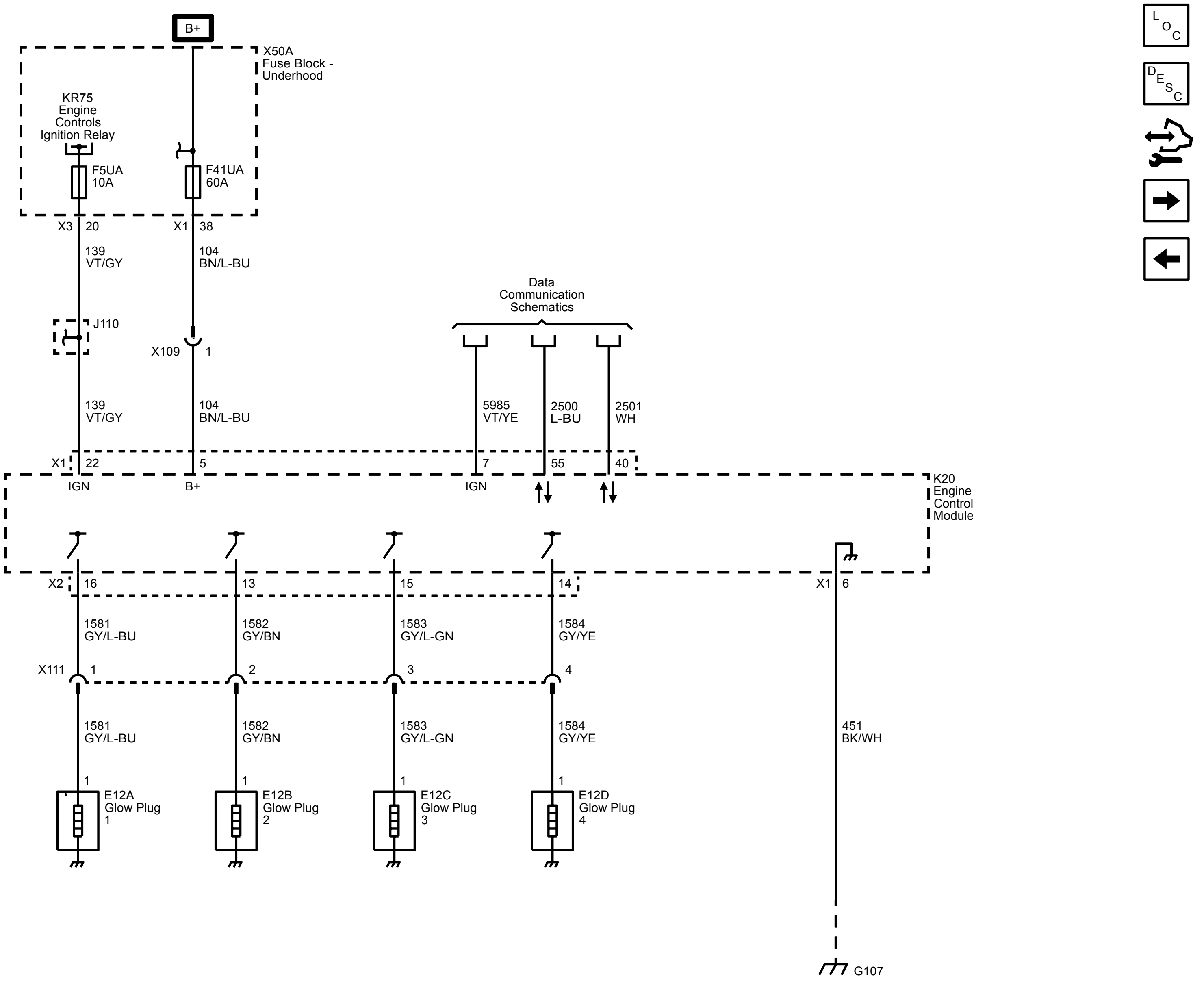

Q47
Exhaust Gas
Recirculation
Cooler
Bypass
Solenoid
Valve
1
2
9
Q14
Exhaust Gas
Recirculation
Valve
6
1
4
2
5
B130A
Exhaust Gas
Recirculation
Temperature
Sensor 1
1
2
B130B
Exhaust Gas
Recirculation
Temperature
Sensor 2
1
2
3231
YE/L-BU
3230
GY/L-BU
5047
L-BU/RD
2753
BK/BN
5763
BN/WH
5746
VT/BK
5764
WH/VT
3237
WH/BN
6274
BK/L-BU
3236
YE/L-GN
6275
BK/YE
X2
94
95
59
57
58
70
71
12V
5V1
X3
24
10
20
19
K20
Engine
Control
Module

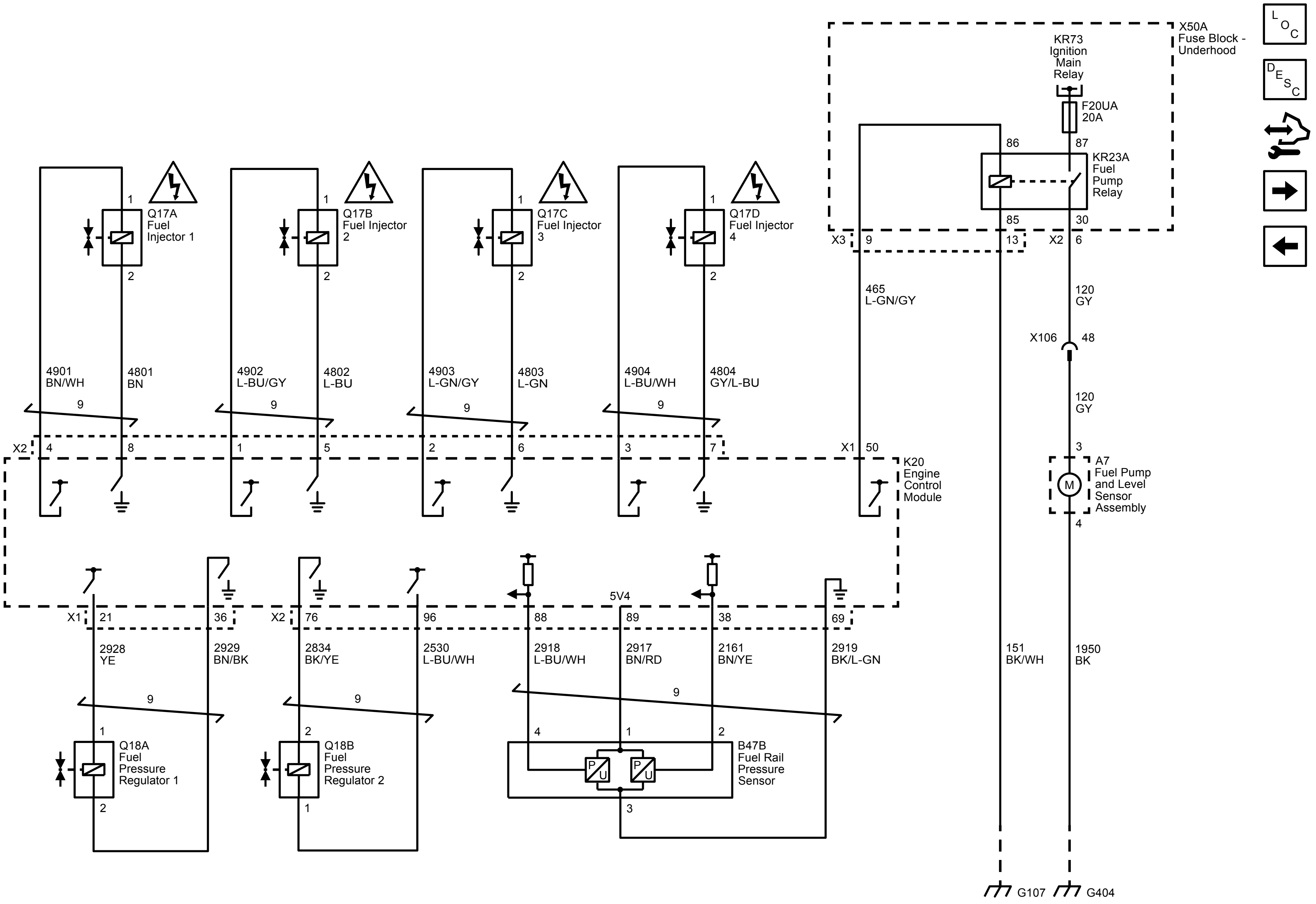
Engine Data Sensors - Turbocharger Controls

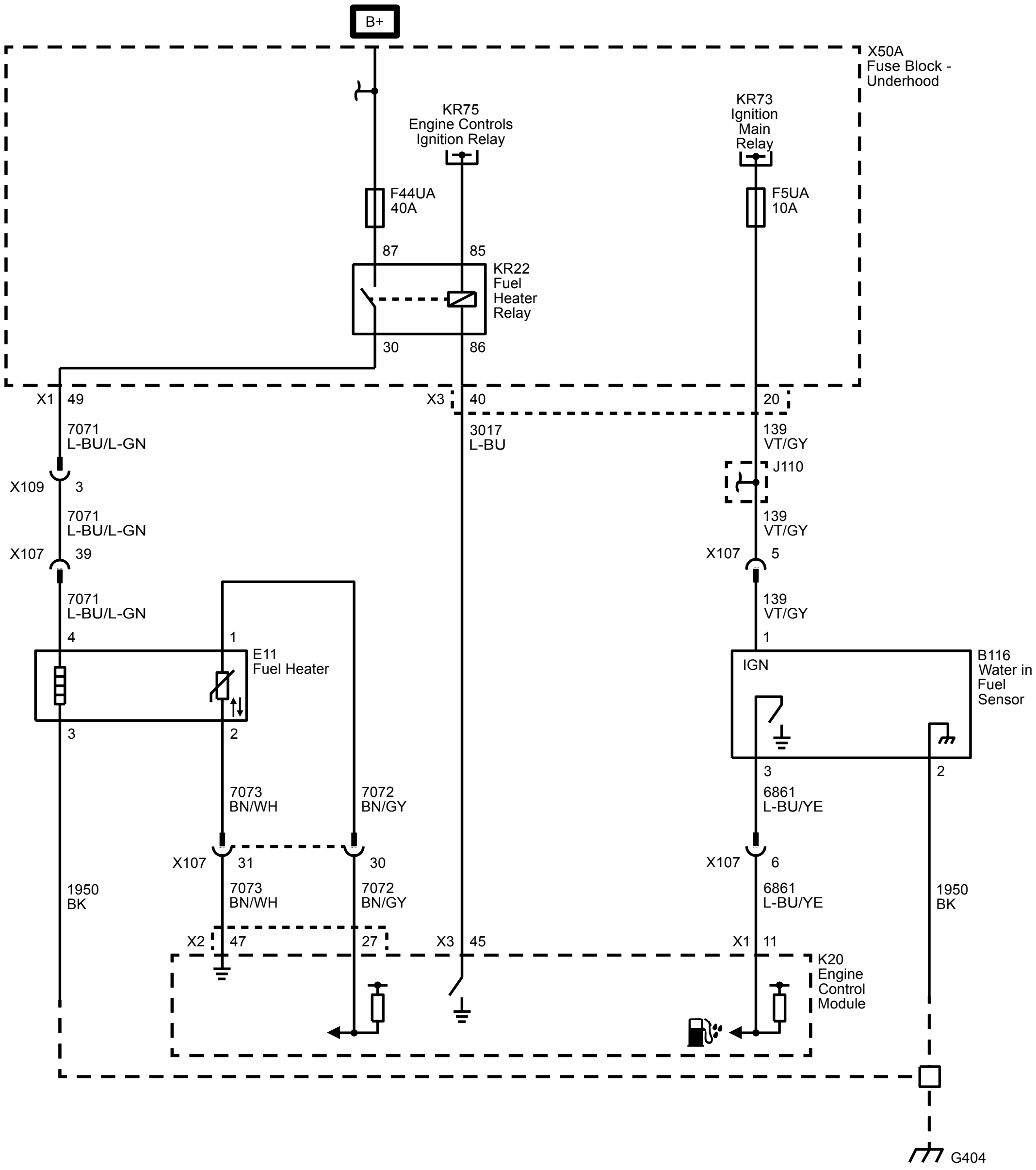
LOC
DESC


X50A
Fuse Block -
Underhood
KR75
Engine
Controls
Ignition Relay
F47UA
7.5A
X3
6
5293
VT/L-BU
2
E45
Positive
Crankcase
Ventilation
Heater
1
1497
YE/L-BU
X3
30
K20
Engine
Control
Module
5V2
X3
46
21
5947
VT/YE
5928
GY/RD
4
5
M103
Turbocharger
Vane Position
Actuator
M
3
2
1
5929
BK/BN
5931
WH/BK
5930
GY/L-BU
33
X2
73
72
X2
32
3683
L-GN
1
B193A
Charge Air
Cooler Inlet
Temperature
Sensor
2
3682
YE/BK
52
31
3681
BN
1
B193B
Charge Air
Cooler
Outlet
Temperature
Sensor
2
3680
YE/L-BU
51
K20
Engine
Control
Module

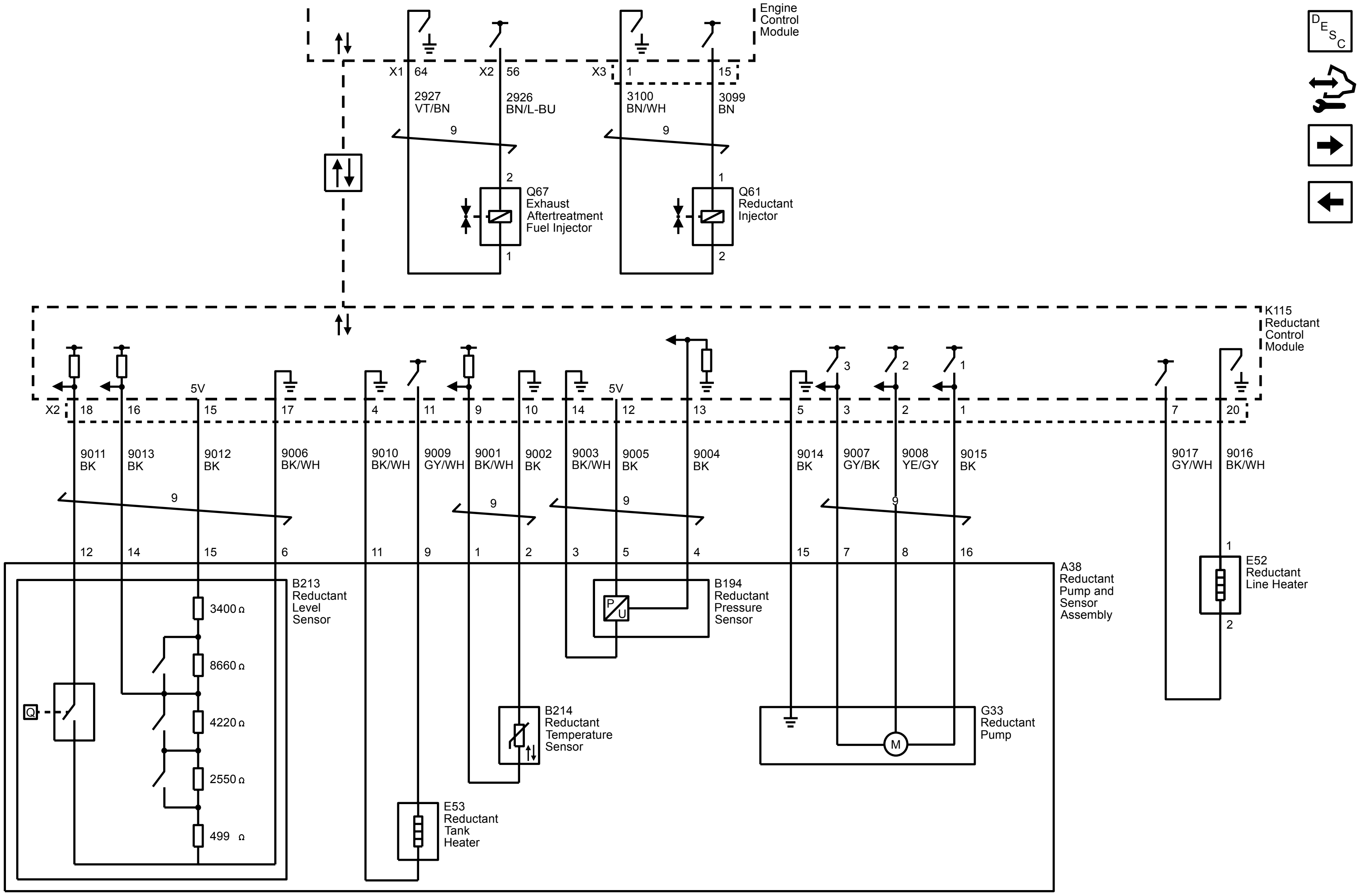

K20 Engine Control Module
K9 Body Control Module
5V1
5V2
5V4
5V
X2 40 41 42 83 85 84
X1 13 28 27
X2 13 7
X1 19
5300 GY/L-BU
5275 YE/VT
5301 BK/L-GN
6270 VT/L-BU
6275 BK/VT
6271 L-GN
1164 WH/RD
1161 YE/WH
1271 BK/L-BU
5359 WH
5361 L-BU/YE
5360 BK/BN
X101 25 32 24
X200 33 34 35
B23 Camshaft Position Sensor
B26 Crankshaft Position Sensor
B107 Accelerator Pedal Position Sensor
B22 Brake Pedal Position Sensor
Q38 Throttle Body
M
1274 BN/RD
1162 L-GN/WH
1272 BK/VT
5382 BK/YE
5380 WH/L-GN
5381 WH/RD
X101 8 23 6
33 34 35
9
2701 BN/RD
3630 L-BU/WH
2752 BK/BN
582 BN/WH
581 YE
X2 43 44 45 90 91
X1 14 15 16 43 59 44
5V2
5V3
5V2
1
2
L O C
D E S C


B+
X50A Fuse Block - Underhood
KR75 Engine Controls Ignition Relay
F5UA 10A
F41UA 60A
X3 20
X1 38
139 VT/GY
104 BN/L-BU
J110
X109 1
139 VT/GY
104 BN/L-BU
Data Communication Schematics
5985 VT/YE
2500 L-BU
2501 WH
X1 22
5
7
55
40
IGN
B+
IGN
K20 Engine Control Module
X2 16
13
15
14
X1 6
1581 GY/L-BU
1582 GY/BN
1583 GY/L-GN
1584 GY/YE
X111 1
2
3
4
1581 GY/L-BU
1582 GY/BN
1583 GY/L-GN
1584 GY/YE
451 BK/WH
1
E12A Glow Plug 1
1
E12B Glow Plug 2
1
E12C Glow Plug 3
1
E12D Glow Plug 4
G107
LOC
DESC

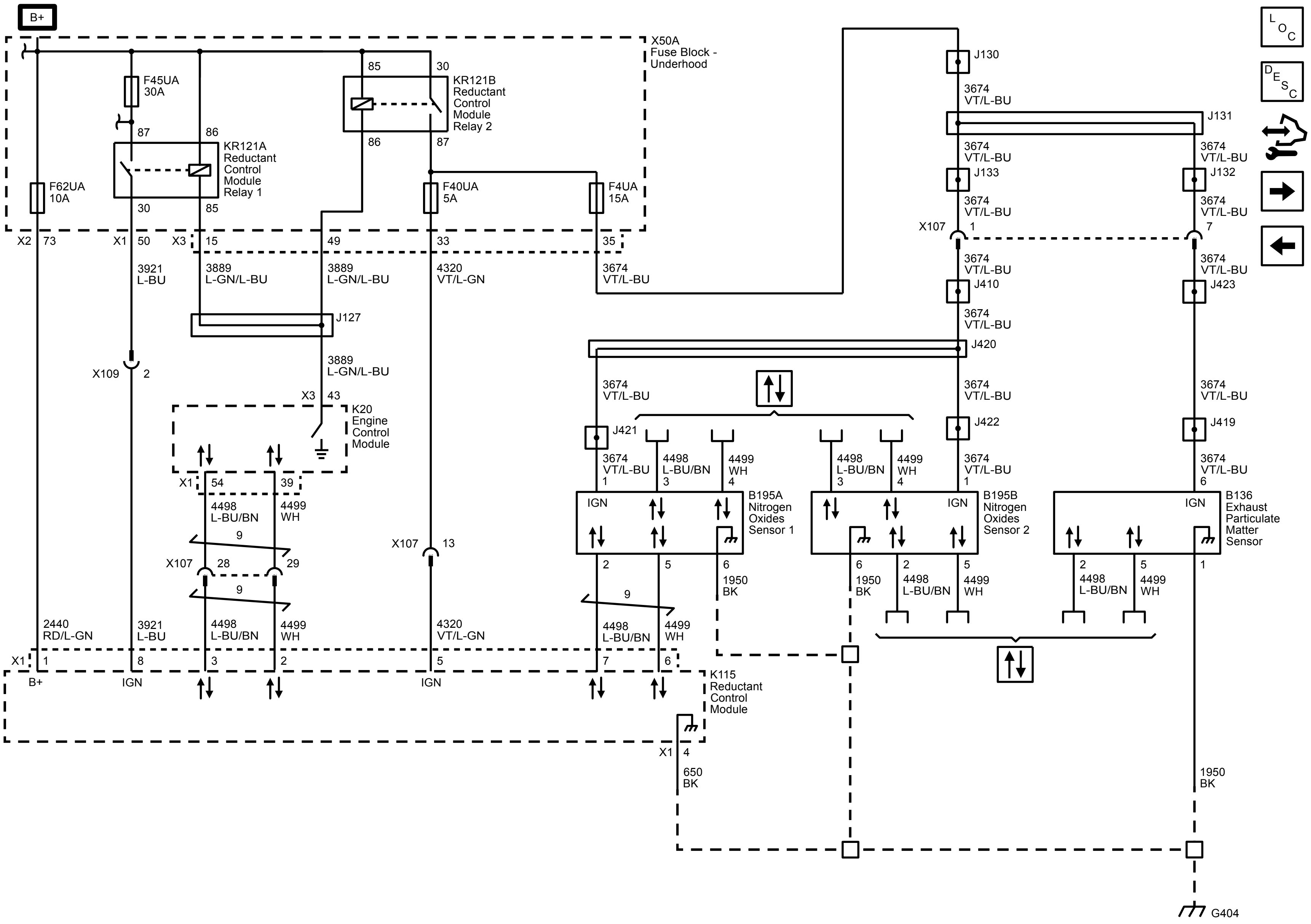

X50A
Fuse Block - Underhood
KR73
Ignition
Main
Relay
F20UA
20A
86
87
KR23A
Fuel
Pump
Relay
85
30
X3
9
13
X2
6
465
L-GN/GY
120
GY
X106
48
120
GY
3
A7
Fuel Pump
and Level
Sensor
Assembly
4
1
Q17A
Fuel
Injector 1
2
1
Q17B
Fuel Injector
2
2
1
Q17C
Fuel Injector
3
2
1
Q17D
Fuel Injector
4
2
4901
BN/WH
4801
BN
4902
L-BU/GY
4802
L-BU
4903
L-GN/GY
4803
L-GN
4904
L-BU/WH
4804
GY/L-BU
9
9
9
9
X2
4
8
1
5
2
6
3
7
X1
50
K20
Engine
Control
Module
5V4
X1
21
36
X2
76
96
88
89
38
69
2928
YE
2929
BN/BK
2834
BK/YE
2530
L-BU/WH
2918
L-BU/WH
2917
BN/RD
2161
BN/YE
2919
BK/L-GN
151
BK/WH
1950
BK
9
9
9
1
Q18A
Fuel
Pressure
Regulator 1
2
2
Q18B
Fuel
Pressure
Regulator 2
1
4
1
2
B47B
Fuel Rail
Pressure
Sensor
3
P
U
P
U
M
G107
G404


B+
X50A
Fuse Block - Underhood
KR75
Engine Controls Ignition Relay
KR73
Ignition Main Relay
F44UA
40A
F5UA
10A
87
85
KR22
Fuel Heater Relay
30
86
X1
49
X3
40
20
7071
L-BU/L-GN
3017
L-BU
139
VT/GY
J110
X109
3
7071
L-BU/L-GN
139
VT/GY
X107
39
X107
5
7071
L-BU/L-GN
139
VT/GY
4
1
E11
Fuel Heater
1
IGN
B116
Water in Fuel Sensor
3
2
3
2
7073
BN/WH
7072
BN/GY
6861
L-BU/YE
X107
31
30
X107
6
1950
BK
7073
BN/WH
7072
BN/GY
6861
L-BU/YE
1950
BK
X2
47
27
X3
45
X1
11
K20
Engine Control Module
G404

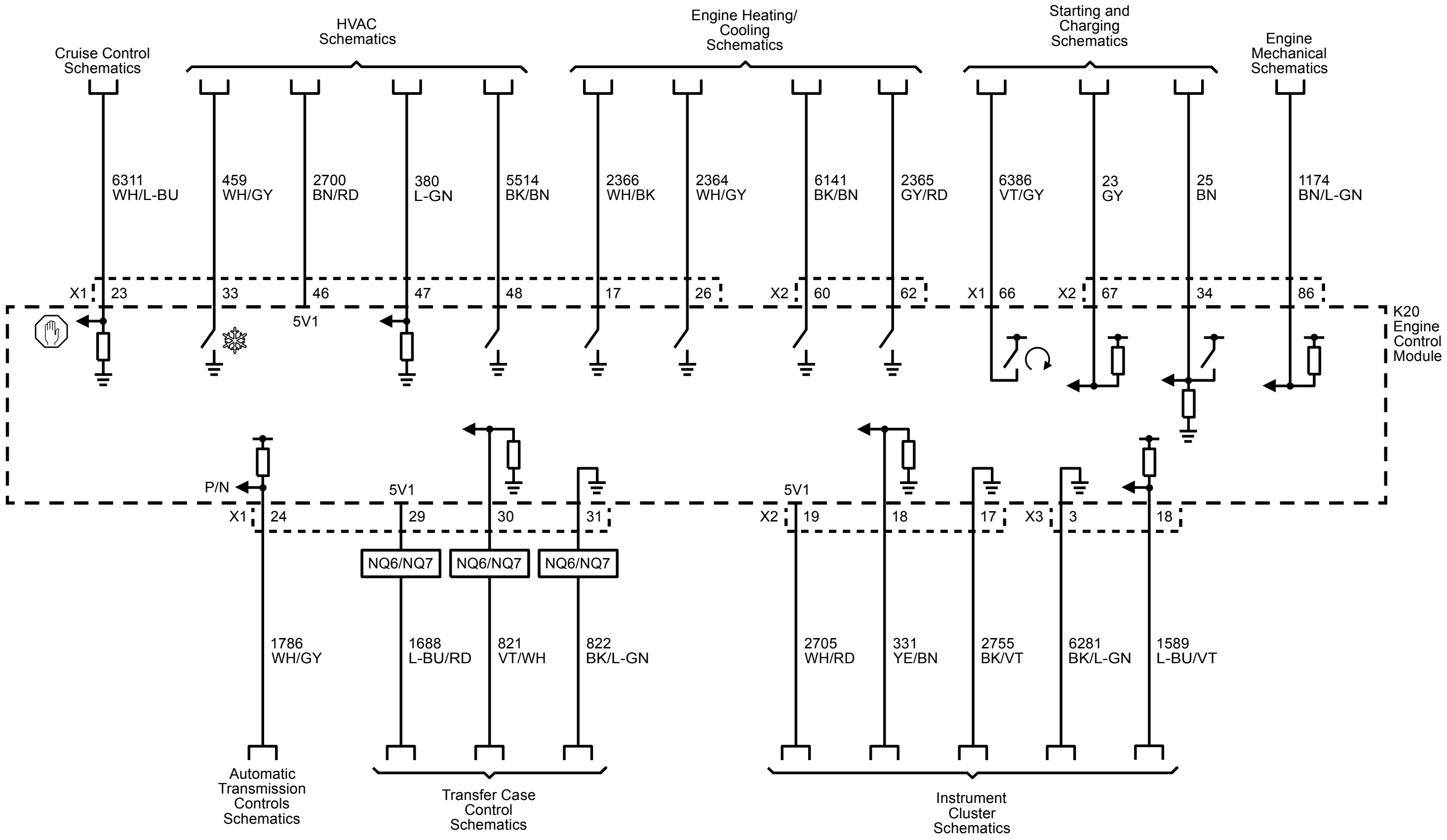
Emission Controls - Reductant System


K20
Engine
Control
Module
X1 64
X2 56
X3 1
15
2927
VT/BN
2926
BN/L-BU
3100
BN/WH
3099
BN
9
9
2
Q67
Exhaust
Aftertreatment
Fuel Injector
1
1
Q61
Reductant
Injector
2
K115
Reductant
Control
Module
5V
5V
3
2
1
X2 18
16
15
17
4
11
9
10
14
12
13
5
3
2
1
7
20
9011
BK
9013
BK
9012
BK
9006
BK/WH
9010
BK/WH
9009
GY/WH
9001
BK/WH
9002
BK
9003
BK/WH
9005
BK
9004
BK
9014
BK
9007
GY/BK
9008
YE/GY
9015
BK
9017
GY/WH
9016
BK/WH
9
9
9
9
12
14
15
6
11
9
1
2
3
5
4
15
7
8
16
A38
Reductant
Pump and
Sensor
Assembly
B213
Reductant
Level
Sensor
3400 Ω
8660 Ω
4220 Ω
2550 Ω
499 Ω
Q
B194
Reductant
Pressure
Sensor
P
U
B214
Reductant
Temperature
Sensor
E53
Reductant
Tank
Heater
G33
Reductant
Pump
M
1
E52
Reductant
Line Heater
2

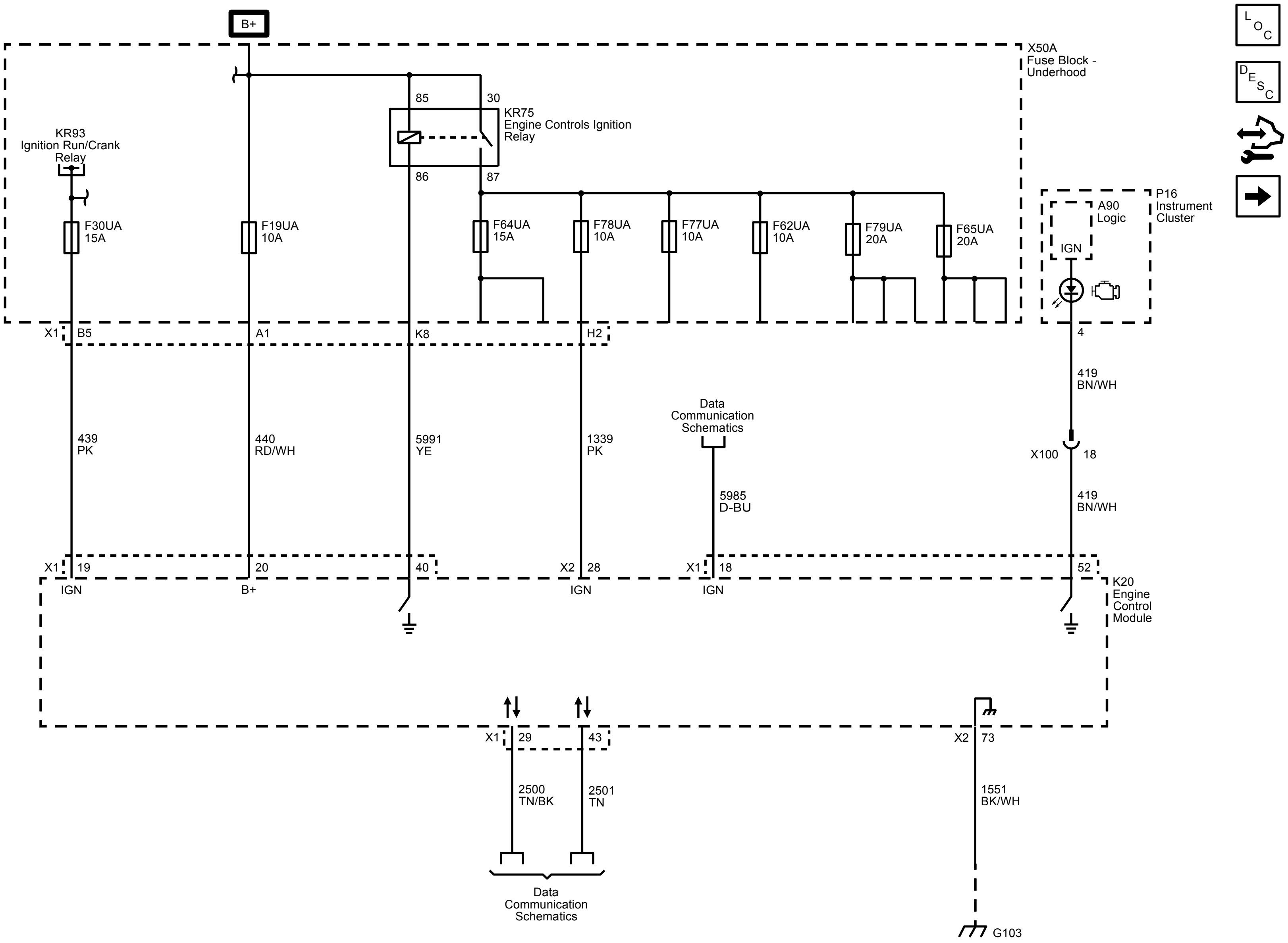
Emission Controls - Nitrogen Oxides, Exhaust Particulate Matter Sensor, and Reductant Sensor Module


B+
X50A
Fuse Block -
Underhood
F45UA
30A
87
86
KR121A
Reductant
Control
Module
Relay 1
30
85
85
30
KR121B
Reductant
Control
Module
Relay 2
86
87
F62UA
10A
F40UA
5A
F4UA
15A
X2 73
X1 50
X3 15
49
33
35
3921
L-BU
3889
L-GN/L-BU
3889
L-GN/L-BU
4320
VT/L-GN
3674
VT/L-BU
J127
X109 2
3889
L-GN/L-BU
X3 43
K20
Engine
Control
Module
X1 54
39
4498
L-BU/BN
4499
WH
9
X107 28
29
9
X107 13
2440
RD/L-GN
3921
L-BU
4498
L-BU/BN
4499
WH
4320
VT/L-GN
4498
L-BU/BN
4499
WH
X1 1
8
3
2
5
7
6
B+
IGN
IGN
K115
Reductant
Control
Module
X1 4
650
BK
J130
3674
VT/L-BU
J131
3674
VT/L-BU
J133
3674
VT/L-BU
J132
3674
VT/L-BU
3674
VT/L-BU
X107 1
7
3674
VT/L-BU
J410
3674
VT/L-BU
J423
3674
VT/L-BU
J420
3674
VT/L-BU
J421
3674
VT/L-BU
J422
3674
VT/L-BU
J419
3674
VT/L-BU
1
4498
L-BU/BN
3
4499
WH
4
4498
L-BU/BN
3
4499
WH
4
3674
VT/L-BU
1
3674
VT/L-BU
6
IGN
B195A
Nitrogen
Oxides
Sensor 1
IGN
B195B
Nitrogen
Oxides
Sensor 2
IGN
B136
Exhaust
Particulate
Matter
Sensor
2
5
6
1950
BK
9
6
1950
BK
2
4498
L-BU/BN
5
4499
WH
2
4498
L-BU/BN
5
4499
WH
1
1950
BK
G404
L O C
D E S C

Controlled/Monitored Subsystem References

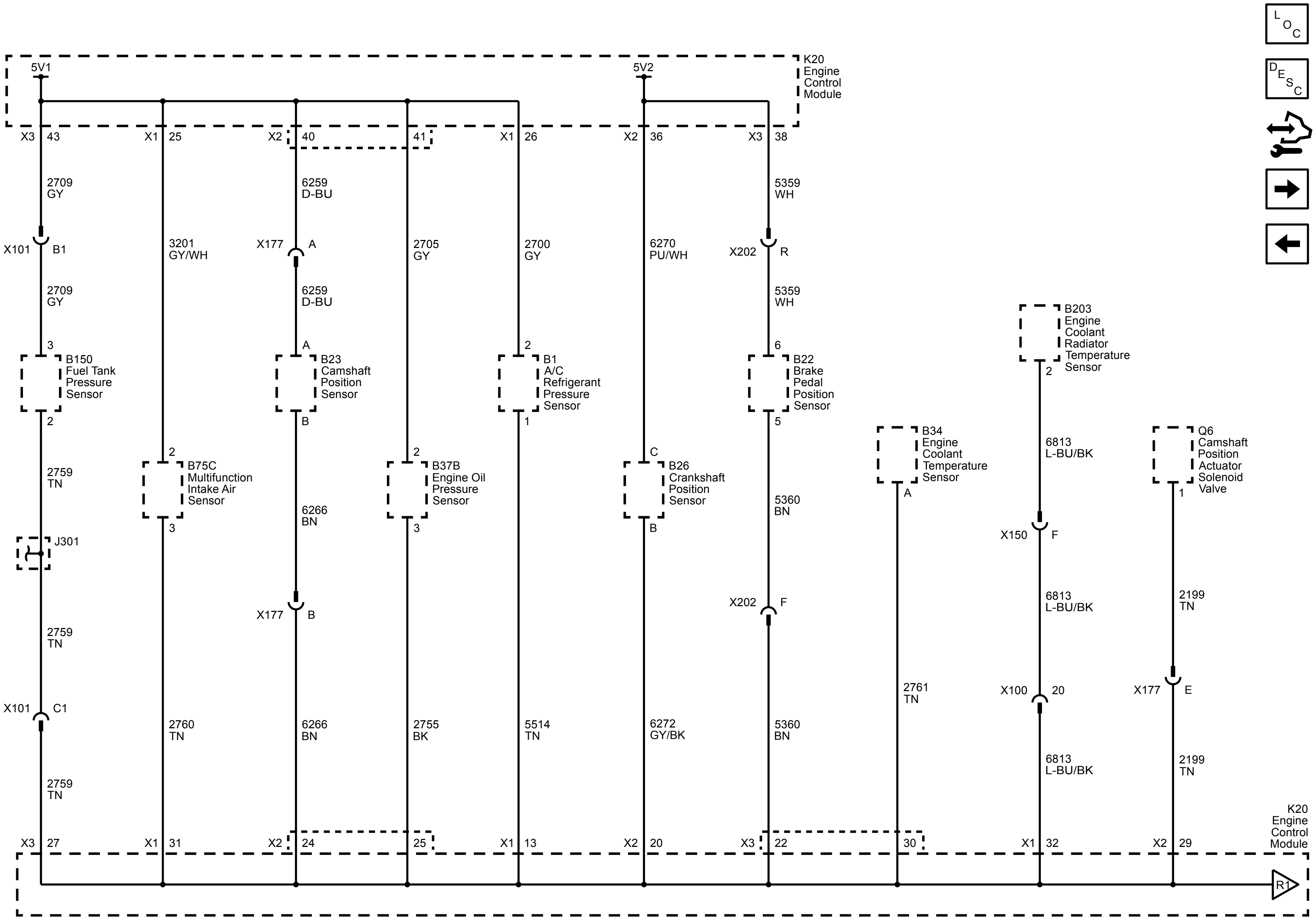

Cruise Control Schematics
HVAC Schematics
Engine Heating/ Cooling Schematics
Starting and Charging Schematics
Engine Mechanical Schematics
6311 WH/L-BU
459 WH/GY
2700 BN/RD
380 L-GN
5514 BK/BN
2366 WH/BK
2364 WH/GY
6141 BK/BN
2365 GY/RD
6386 VT/GY
23 GY
25 BN
1174 BN/L-GN
X1
23
33
46
47
48
17
26
X2
60
62
X1
66
X2
67
34
86
5V1
K20 Engine Control Module
P/N
5V1
5V1
X1
24
29
30
31
X2
19
18
17
X3
3
18
NQ6/NQ7
NQ6/NQ7
NQ6/NQ7
1786 WH/GY
1688 L-BU/RD
821 VT/WH
822 BK/L-GN
2705 WH/RD
331 YE/BN
2755 BK/VT
6281 BK/L-GN
1589 L-BU/VT
Automatic Transmission Controls Schematics
Transfer Case Control Schematics
Instrument Cluster Schematics

Module Power, Ground, Serial Data and MIL

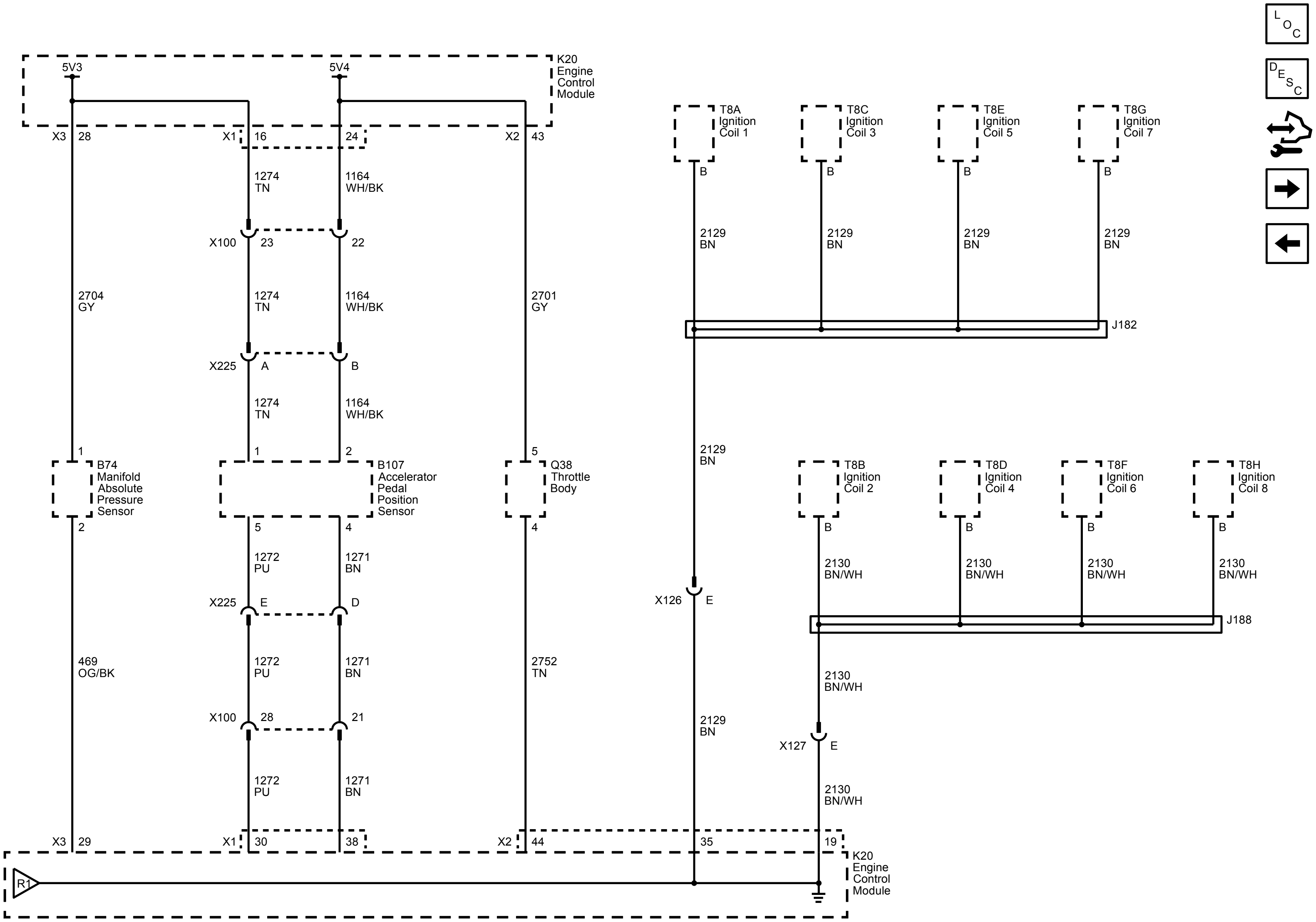


B+
X50A Fuse Block - Underhood
KR93 Ignition Run/Crank Relay
KR75 Engine Controls Ignition Relay
85
30
86
87
F30UA 15A
F19UA 10A
F64UA 15A
F78UA 10A
F77UA 10A
F62UA 10A
F79UA 20A
F65UA 20A
X1
B5
A1
K8
H2
439 PK
440 RD/WH
5991 YE
1339 PK
Data Communication Schematics
5985 D-BU
P16 Instrument Cluster
A90 Logic
IGN
4
419 BN/WH
X100
18
419 BN/WH
X1
19
20
40
X2
28
X1
18
52
IGN
B+
IGN
IGN
K20 Engine Control Module
X1
29
43
X2
73
2500 TN/BK
2501 TN
1551 BK/WH
Data Communication Schematics
G103

5V1, 5V2, and Low Reference Bus (1 of 2)

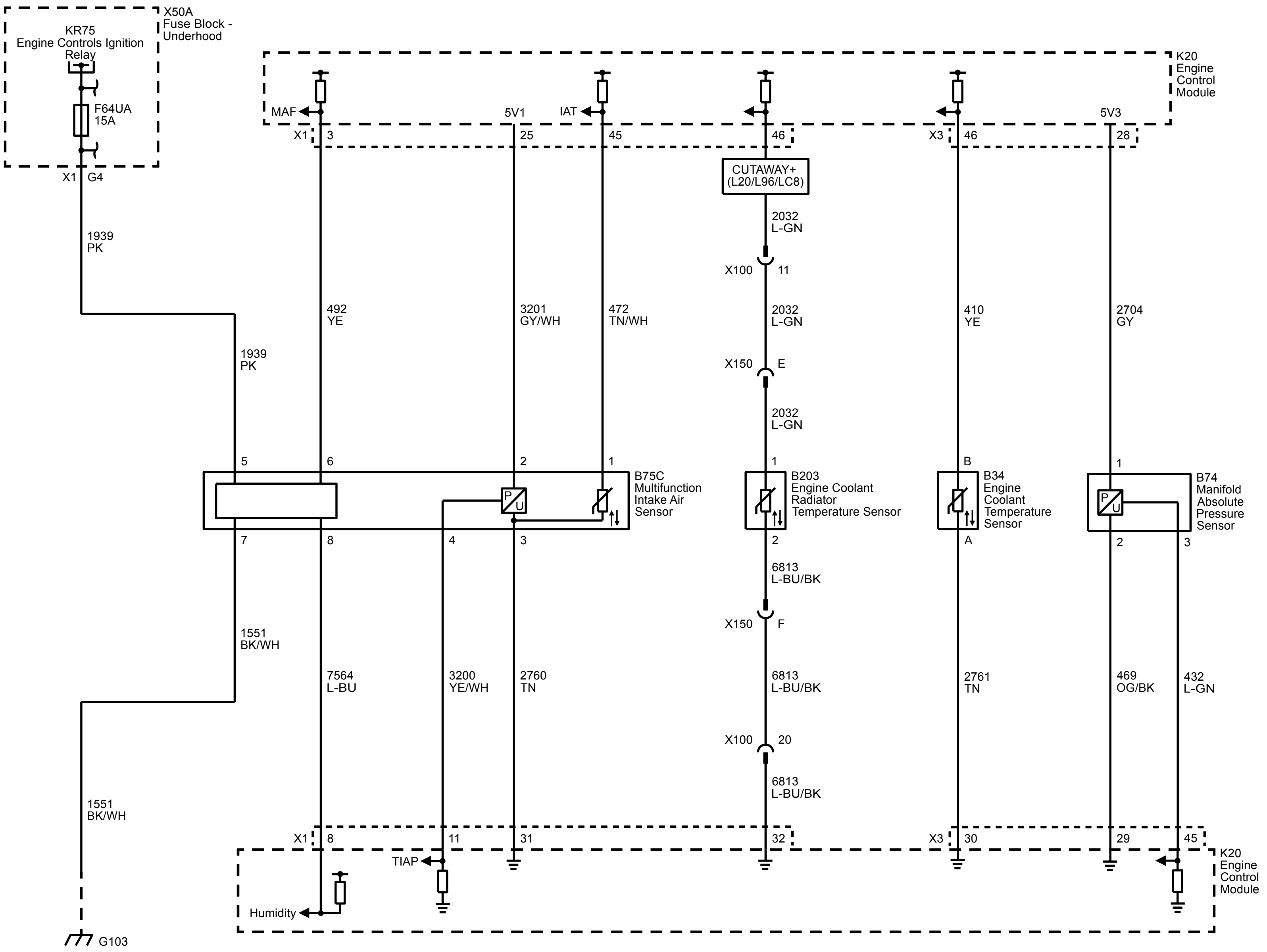


K20 Engine Control Module
5V1
5V2
X3 43
X1 25
X2 40
41
X1 26
X2 36
X3 38
2709 GY
X101 B1
3201 GY/WH
X177 A
6259 D-BU
2705 GY
2700 GY
6270 PU/WH
5359 WH
X202 R
B150 Fuel Tank Pressure Sensor
B23 Camshaft Position Sensor
B1 A/C Refrigerant Pressure Sensor
B22 Brake Pedal Position Sensor
B203 Engine Coolant Radiator Temperature Sensor
B75C Multifunction Intake Air Sensor
B37B Engine Oil Pressure Sensor
B26 Crankshaft Position Sensor
B34 Engine Coolant Temperature Sensor
Q6 Camshaft Position Actuator Solenoid Valve
2759 TN
J301
6266 BN
5360 BN
6813 L-BU/BK
X150 F
X177 B
X202 F
2199 TN
X177 E
X101 C1
X100 20
2761 TN
2760 TN
2755 BK
5514 TN
6272 GY/BK
X3 27
X1 31
X2 24
25
X1 13
X2 20
X3 22
30
X1 32
X2 29
R1

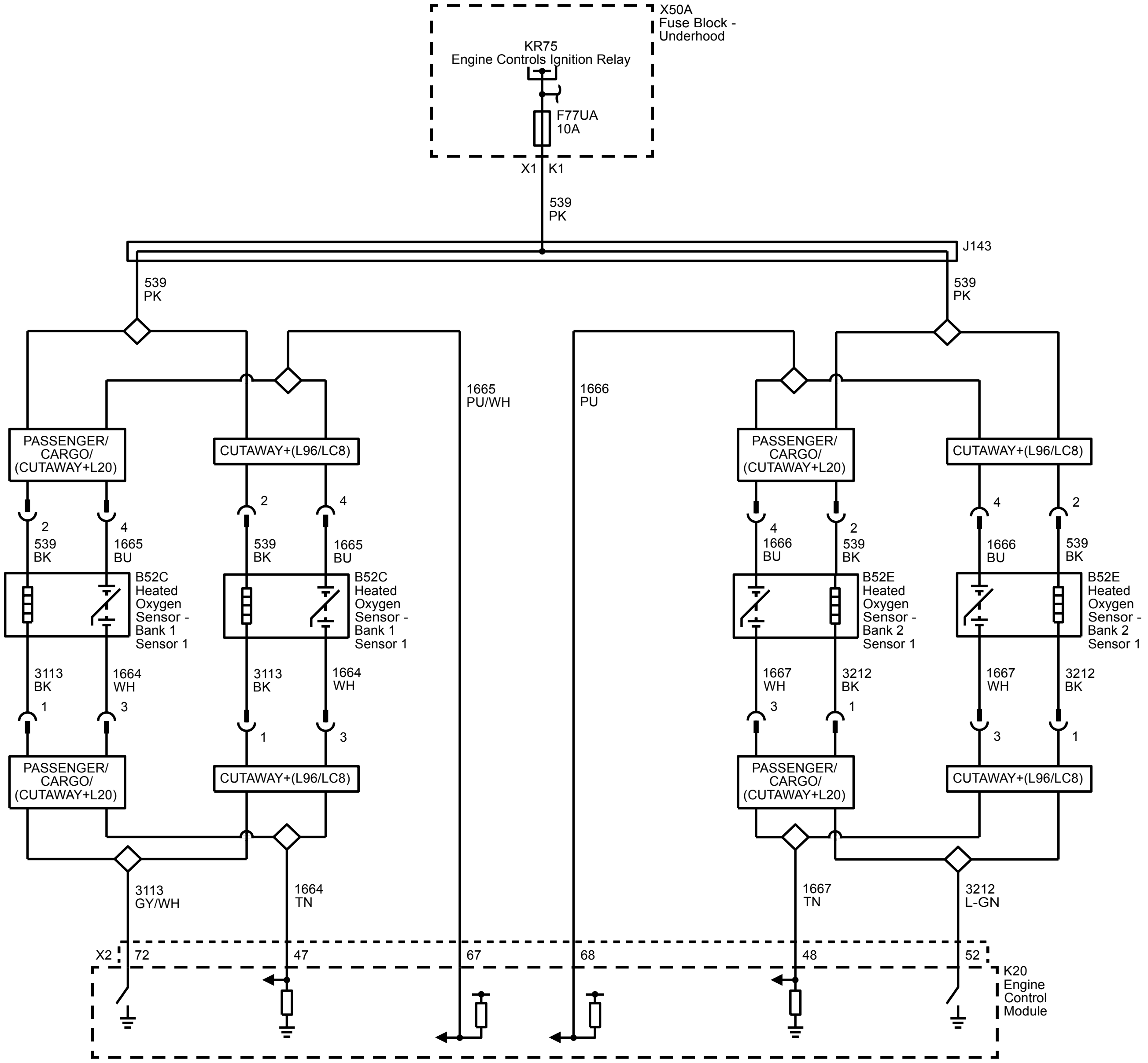


5V3
5V4
K20 Engine Control Module
X3 28
X1 16
24
X2 43
1274 TN
1164 WH/BK
X100 23
22
2704 GY
2701 GY
X225 A
B
1
2
5
B74 Manifold Absolute Pressure Sensor
B107 Accelerator Pedal Position Sensor
Q38 Throttle Body
4
1272 PU
1271 BN
X225 E
D
469 OG/BK
2752 TN
X100 28
21
X3 29
X1 30
38
X2 44
35
19
R1
T8A Ignition Coil 1
T8C Ignition Coil 3
T8E Ignition Coil 5
T8G Ignition Coil 7
B
2129 BN
J182
T8B Ignition Coil 2
T8D Ignition Coil 4
T8F Ignition Coil 6
T8H Ignition Coil 8
2130 BN/WH
J188
X126 E
X127 E
LOC
DESC

Engine Data Sensors - Pressure and Temperature Controls

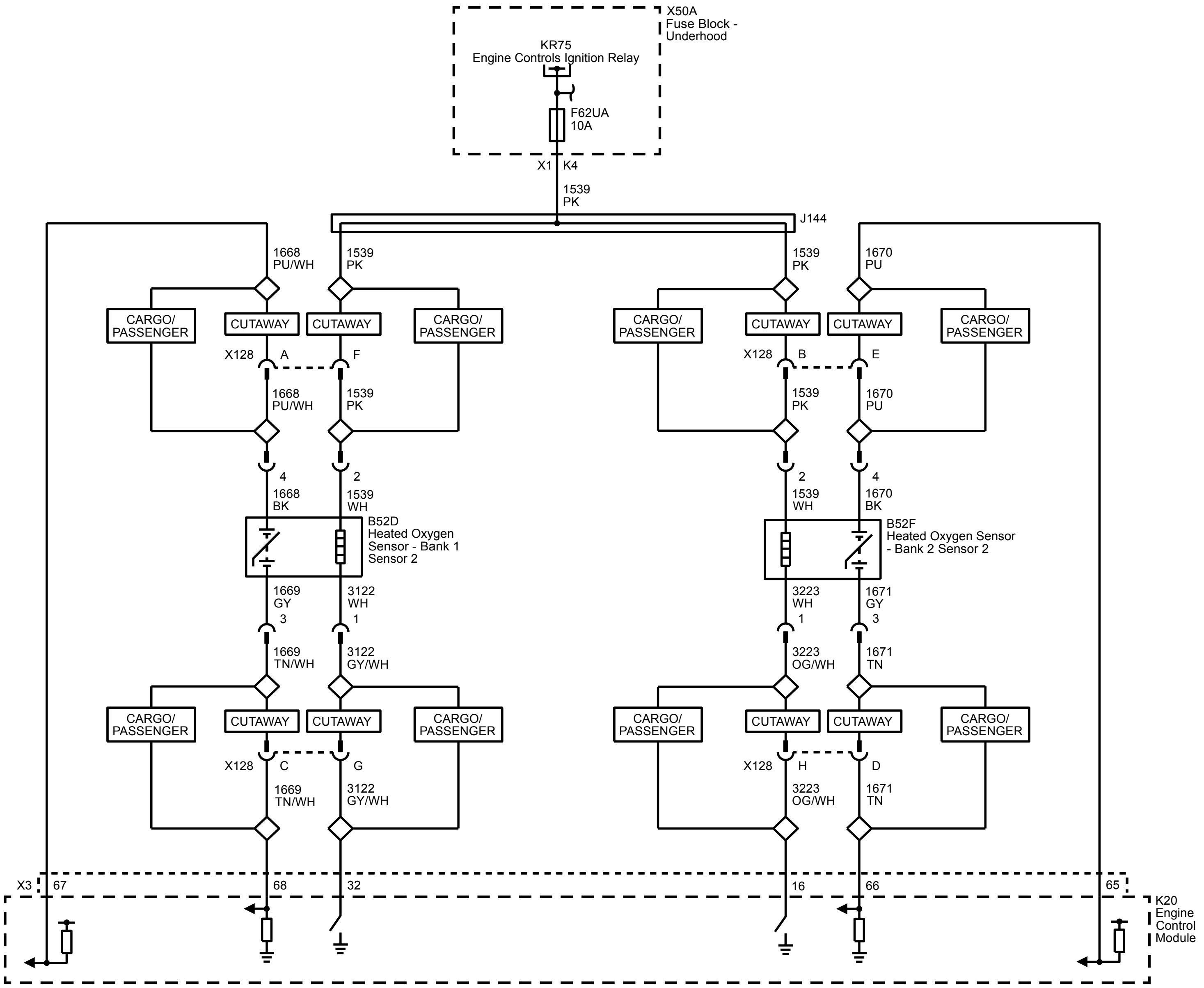

X50A
Fuse Block - Underhood
KR75
Engine Controls Ignition Relay
F64UA
15A
X1
G4
1939
PK
1939
PK
1551
BK/WH
1551
BK/WH
G103
K20
Engine Control Module
MAF
5V1
IAT
5V3
X1
3
25
45
46
X3
46
28
CUTAWAY+
(L20/L96/LC8)
2032
L-GN
X100
11
2032
L-GN
X150
E
2032
L-GN
492
YE
3201
GY/WH
472
TN/WH
410
YE
2704
GY
5
6
2
1
B75C
Multifunction Intake Air Sensor
P
U
7
8
4
3
1
B203
Engine Coolant Radiator Temperature Sensor
2
6813
L-BU/BK
X150
F
6813
L-BU/BK
X100
20
6813
L-BU/BK
B
B34
Engine Coolant Temperature Sensor
A
1
B74
Manifold Absolute Pressure Sensor
2
3
7564
L-BU
3200
YE/WH
2760
TN
2761
TN
469
OG/BK
432
L-GN
X1
8
11
31
32
X3
30
29
45
TIAP
Humidity
K20
Engine Control Module

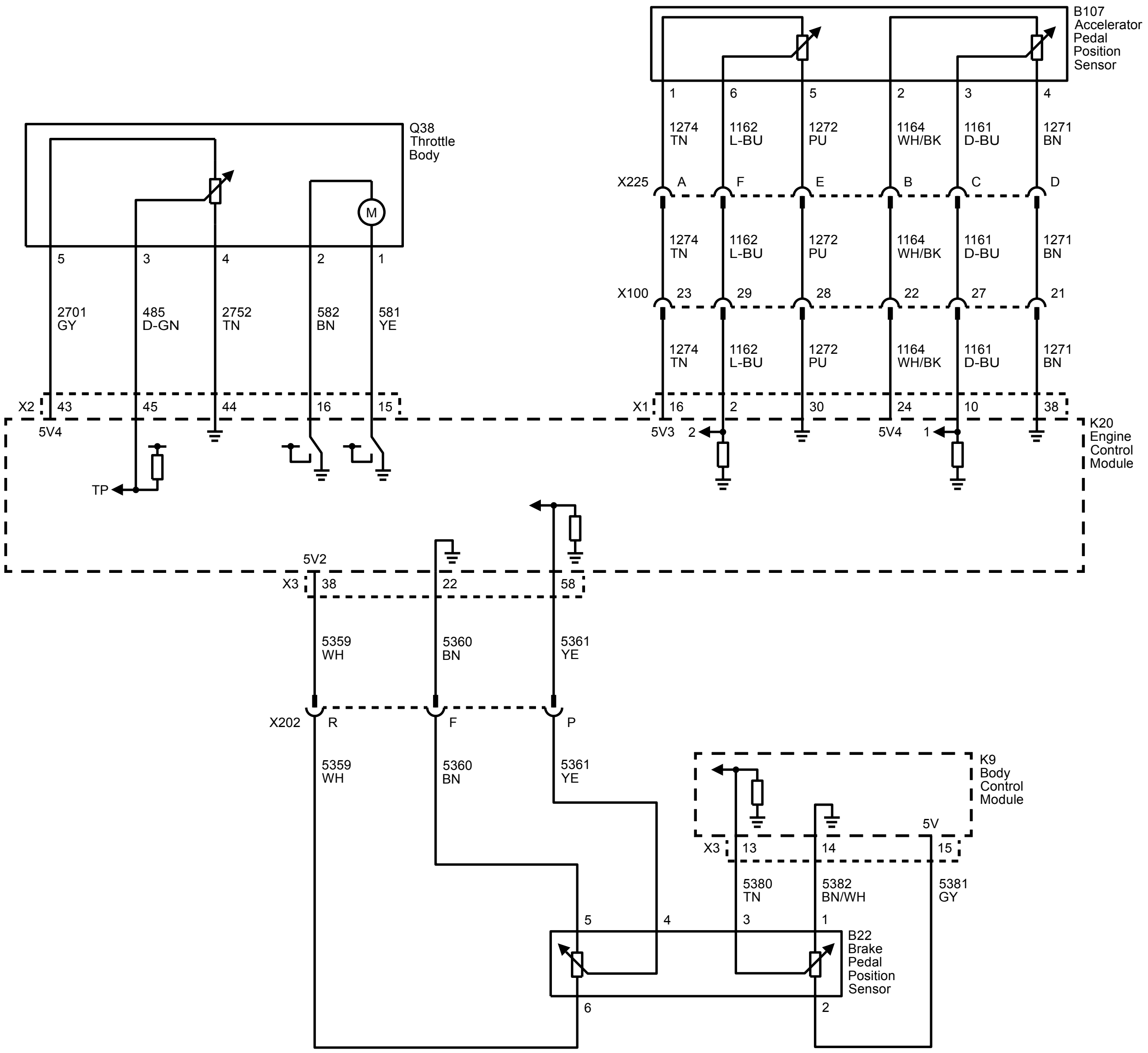
Engine Data Sensors - Heated Oxygen Sensors (1 of 2)


X50A
Fuse Block - Underhood
KR75
Engine Controls Ignition Relay
F77UA
10A
X1
K1
539
PK
J143
539
PK
539
PK
1665
PU/WH
1666
PU
PASSENGER/ CARGO/ (CUTAWAY+L20)
CUTAWAY+(L96/LC8)
PASSENGER/ CARGO/ (CUTAWAY+L20)
CUTAWAY+(L96/LC8)
2
539
BK
4
1665
BU
2
539
BK
4
1665
BU
4
1666
BU
2
539
BK
4
1666
BU
2
539
BK
B52C
Heated Oxygen Sensor - Bank 1 Sensor 1
B52C
Heated Oxygen Sensor - Bank 1 Sensor 1
B52E
Heated Oxygen Sensor - Bank 2 Sensor 1
B52E
Heated Oxygen Sensor - Bank 2 Sensor 1
3113
BK
1
1664
WH
3
3113
BK
1
1664
WH
3
1667
WH
3
3212
BK
1
1667
WH
3
3212
BK
1
PASSENGER/ CARGO/ (CUTAWAY+L20)
CUTAWAY+(L96/LC8)
PASSENGER/ CARGO/ (CUTAWAY+L20)
CUTAWAY+(L96/LC8)
3113
GY/WH
1664
TN
1667
TN
3212
L-GN
X2
72
47
67
68
48
52
K20
Engine Control Module

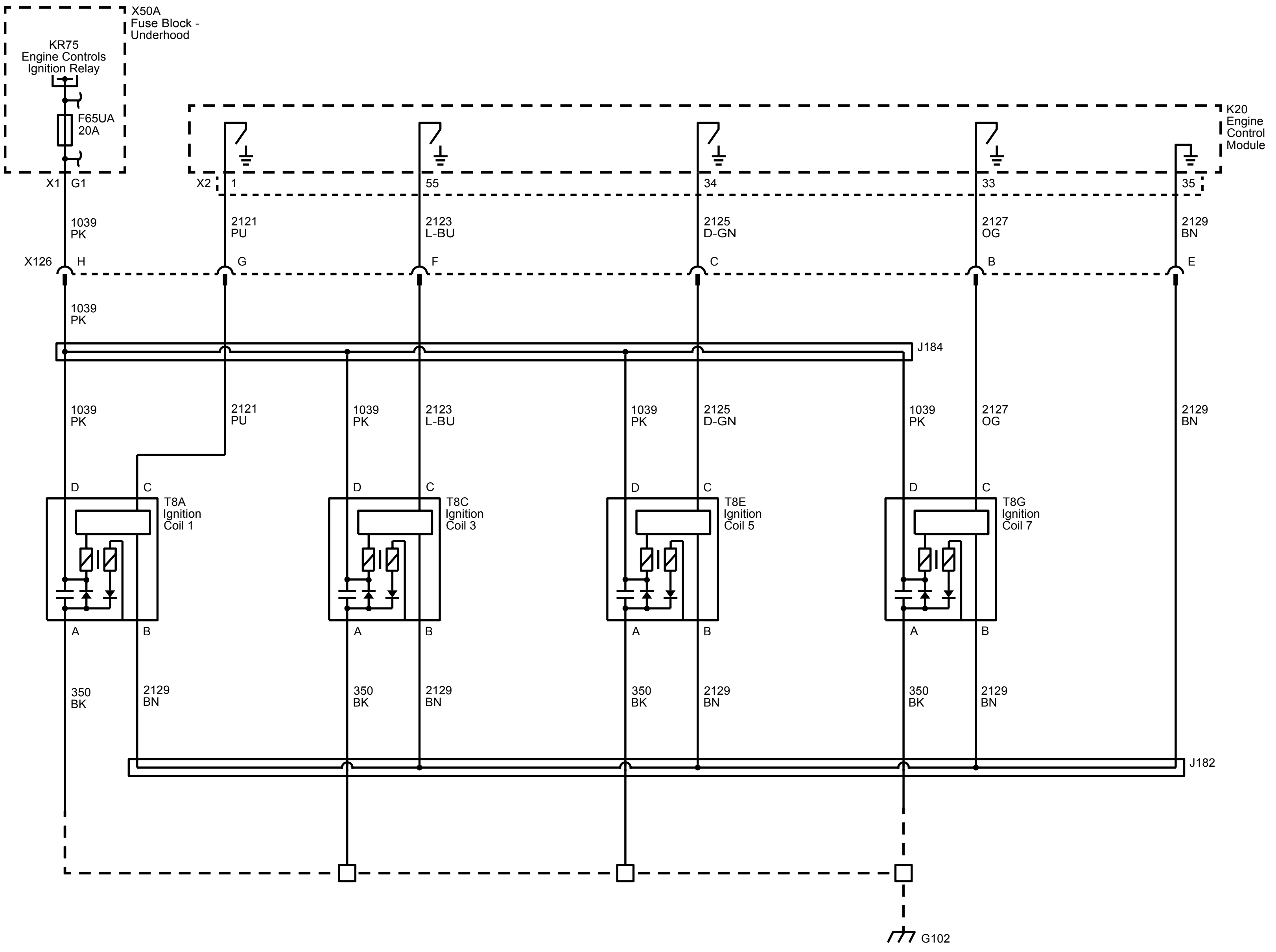
Engine Data Sensors - Heated Oxygen Sensors (2 of 2)

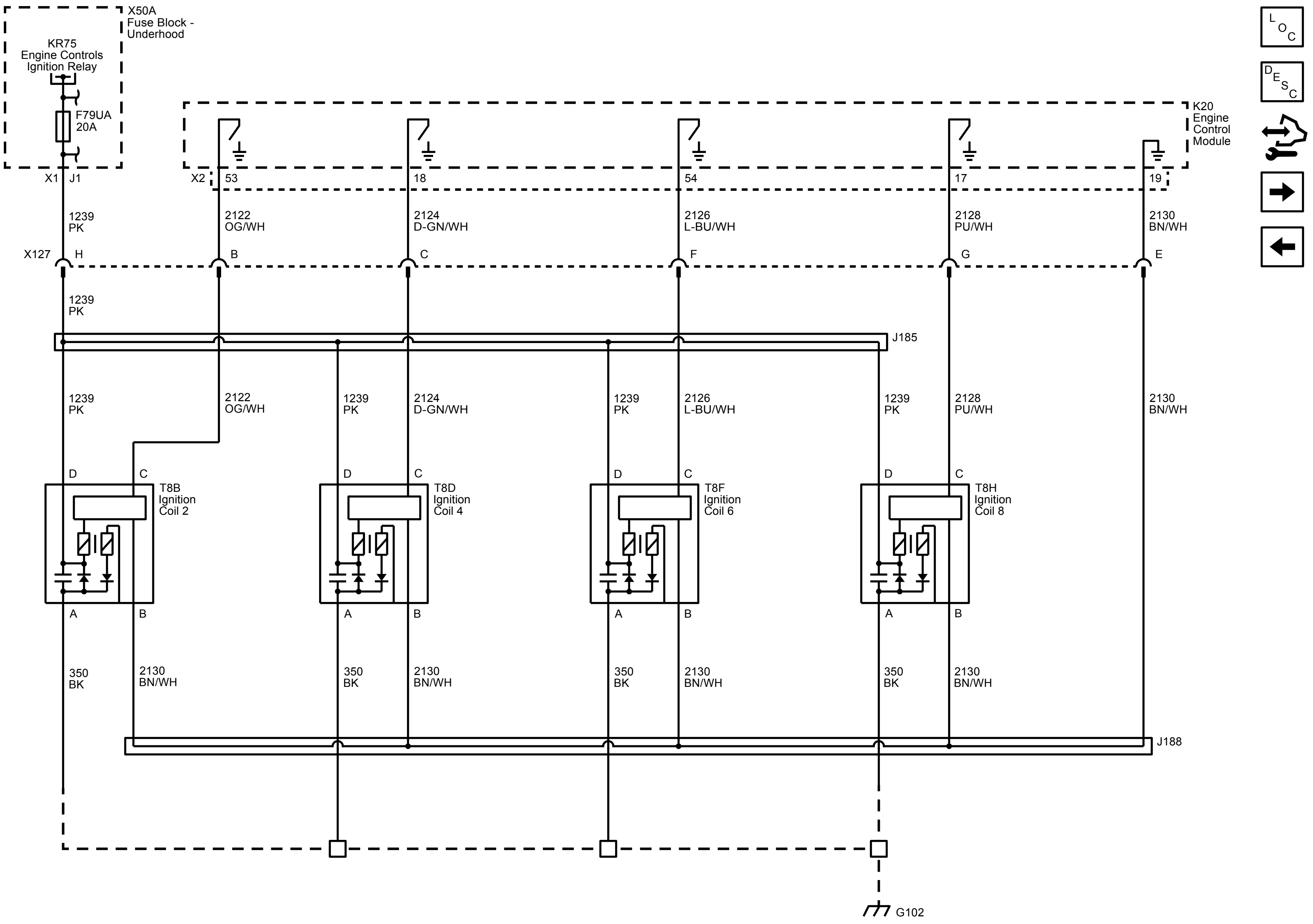
LOC
DESC


X50A
Fuse Block -
Underhood
KR75
Engine Controls Ignition Relay
F62UA
10A
X1
K4
1539
PK
J144
1668
PU/WH
1539
PK
1539
PK
1670
PU
CARGO/
PASSENGER
CUTAWAY
CUTAWAY
CARGO/
PASSENGER
CARGO/
PASSENGER
CUTAWAY
CUTAWAY
CARGO/
PASSENGER
X128
A
F
X128
B
E
1668
PU/WH
1539
PK
1539
PK
1670
PU
4
2
2
4
1668
BK
1539
WH
1539
WH
1670
BK
B52D
Heated Oxygen
Sensor - Bank 1
Sensor 2
B52F
Heated Oxygen Sensor
- Bank 2 Sensor 2
1669
GY
3122
WH
3223
WH
1671
GY
3
1
1
3
1669
TN/WH
3122
GY/WH
3223
OG/WH
1671
TN
CARGO/
PASSENGER
CUTAWAY
CUTAWAY
CARGO/
PASSENGER
CARGO/
PASSENGER
CUTAWAY
CUTAWAY
CARGO/
PASSENGER
X128
C
G
X128
H
D
1669
TN/WH
3122
GY/WH
3223
OG/WH
1671
TN
X3
67
68
32
16
66
65
K20
Engine
Control
Module

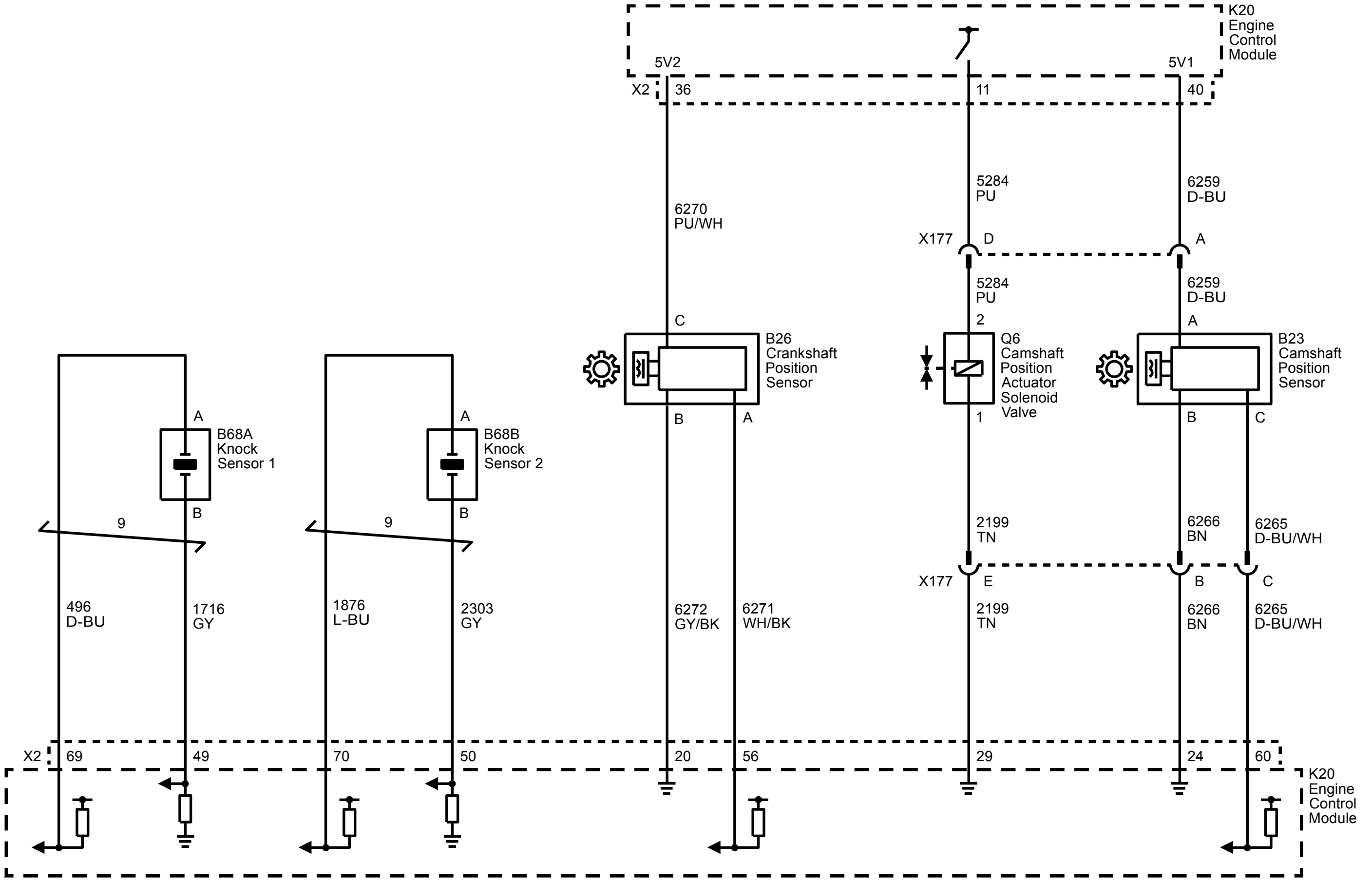

B107
Accelerator
Pedal
Position
Sensor
1
6
5
2
3
4
1274
TN
1162
L-BU
1272
PU
1164
WH/BK
1161
D-BU
1271
BN
X225
A
F
E
B
C
D
X100
23
29
28
22
27
21
Q38
Throttle
Body
M
5
3
4
2
1
2701
GY
485
D-GN
2752
TN
582
BN
581
YE
X2
43
45
44
16
15
5V4
TP
X1
16
2
30
24
10
38
5V3
2
5V4
1
K20
Engine
Control
Module
5V2
X3
38
22
58
5359
WH
5360
BN
5361
YE
X202
R
F
P
K9
Body
Control
Module
5V
X3
13
14
15
5380
TN
5382
BN/WH
5381
GY
5
4
3
1
B22
Brake
Pedal
Position
Sensor
6
2

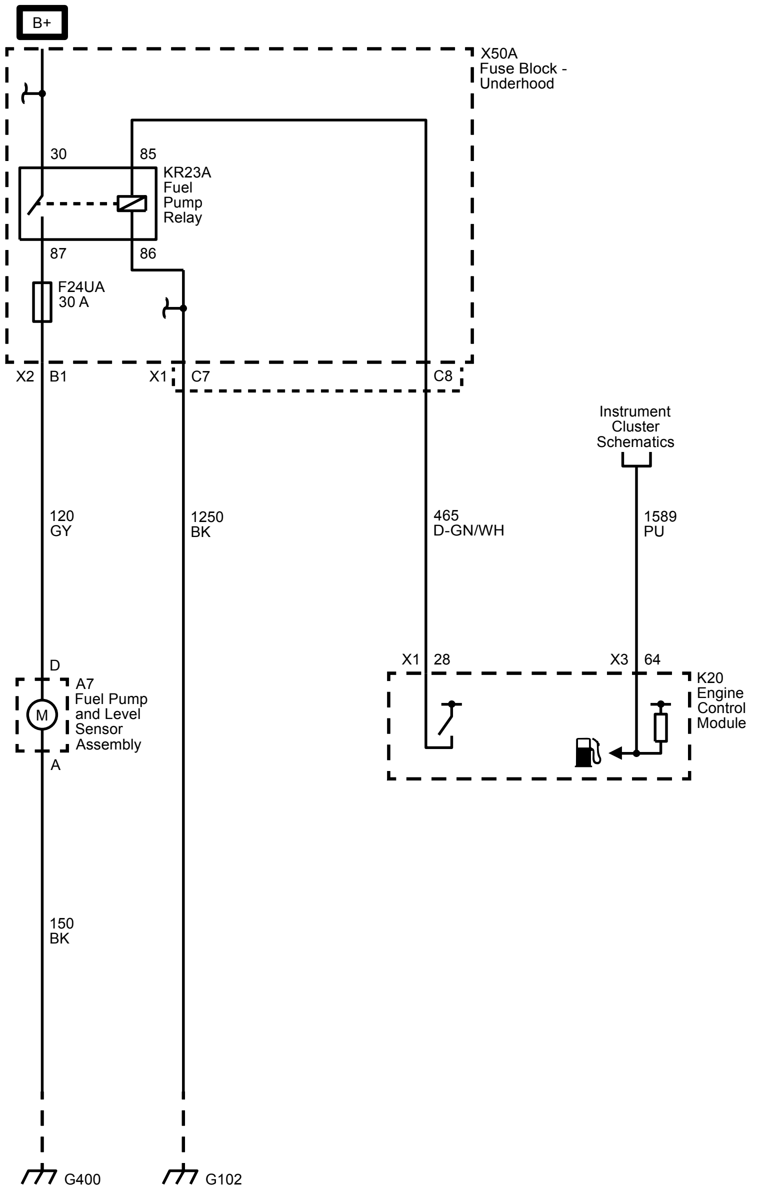
Ignition Controls - Ignition System Coils 1, 3, 5, and 7


X50A
Fuse Block -
Underhood
KR75
Engine Controls
Ignition Relay
F65UA
20A
X1
G1
K20
Engine
Control
Module
X2
1
55
34
33
35
1039
PK
2121
PU
2123
L-BU
2125
D-GN
2127
OG
2129
BN
X126
H
G
F
C
B
E
1039
PK
J184
1039
PK
2121
PU
1039
PK
2123
L-BU
1039
PK
2125
D-GN
1039
PK
2127
OG
2129
BN
D
C
T8A
Ignition
Coil 1
D
C
T8C
Ignition
Coil 3
D
C
T8E
Ignition
Coil 5
D
C
T8G
Ignition
Coil 7
A
B
A
B
A
B
A
B
350
BK
2129
BN
350
BK
2129
BN
350
BK
2129
BN
350
BK
2129
BN
J182
G102

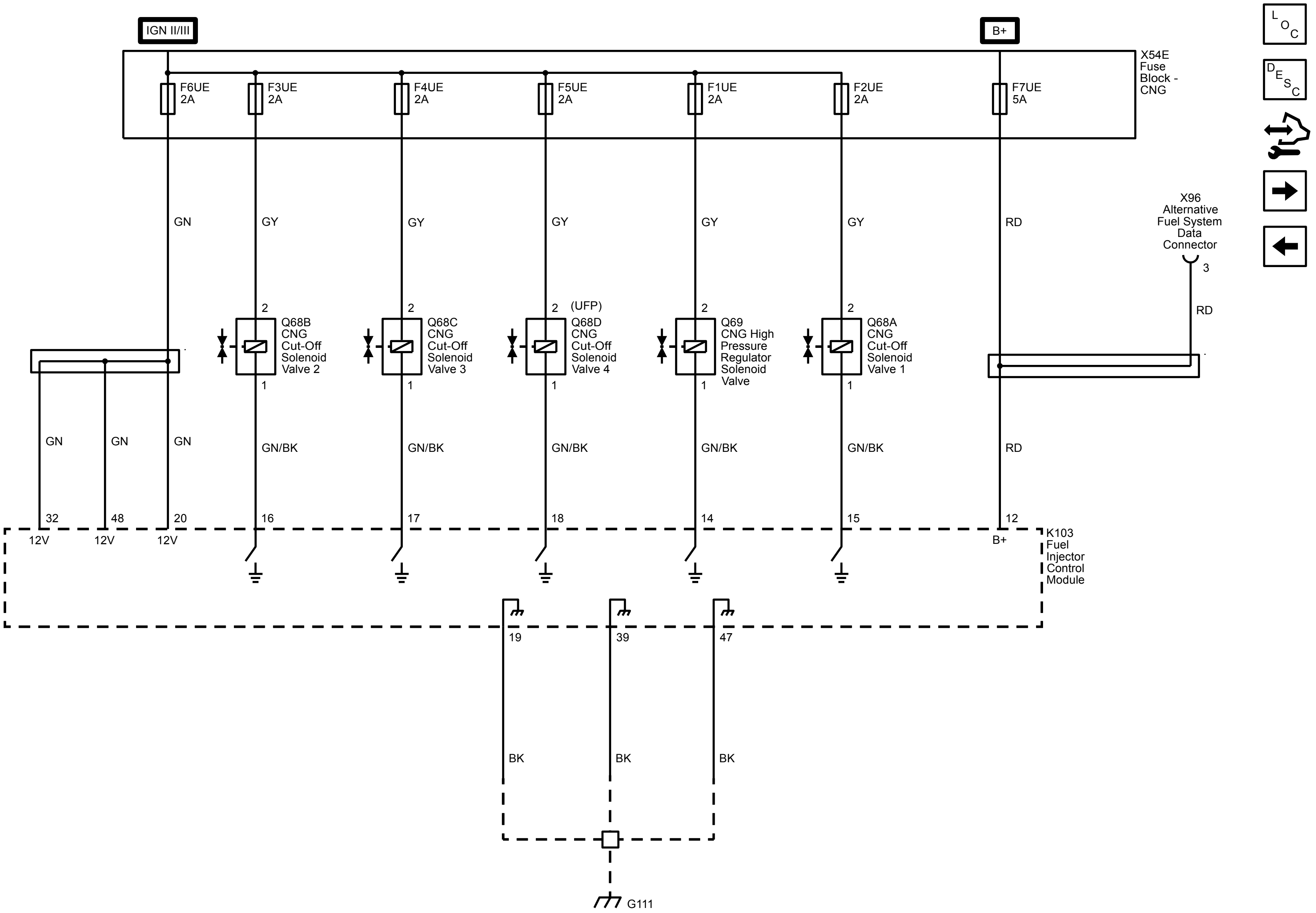

X50A
Fuse Block - Underhood
KR75
Engine Controls
Ignition Relay
F79UA
20A
X1 J1
K20
Engine
Control
Module
X2 53
18
54
17
19
1239
PK
2122
OG/WH
2124
D-GN/WH
2126
L-BU/WH
2128
PU/WH
2130
BN/WH
X127 H
B
C
F
G
E
J185
T8B
Ignition
Coil 2
T8D
Ignition
Coil 4
T8F
Ignition
Coil 6
T8H
Ignition
Coil 8
D
C
A
B
350
BK
J188
G102
LOC
DESC

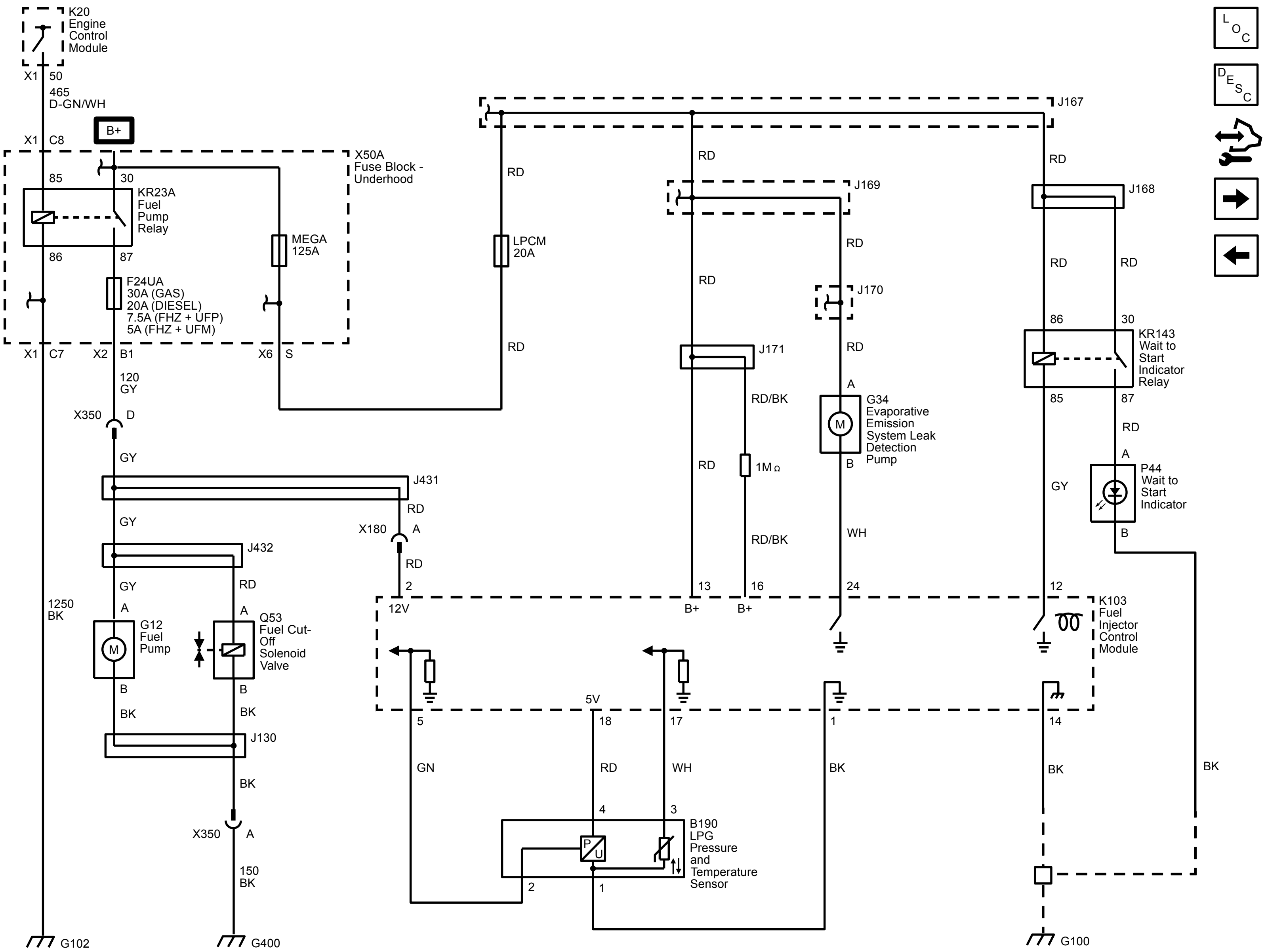
Ignition Controls - CKP, CMP and Knock Sensors


K20
Engine
Control
Module
5V2
5V1
X2
36
11
40
6270
PU/WH
5284
PU
6259
D-BU
X177
D
A
5284
PU
6259
D-BU
C
2
A
B26
Crankshaft
Position
Sensor
Q6
Camshaft
Position
Actuator
Solenoid
Valve
B23
Camshaft
Position
Sensor
B
A
1
B
C
A
B68A
Knock
Sensor 1
A
B68B
Knock
Sensor 2
B
B
9
9
2199
TN
6266
BN
6265
D-BU/WH
X177
E
B
C
496
D-BU
1716
GY
1876
L-BU
2303
GY
6272
GY/BK
6271
WH/BK
2199
TN
6266
BN
6265
D-BU/WH
X2
69
49
70
50
20
56
29
24
60
K20
Engine
Control
Module

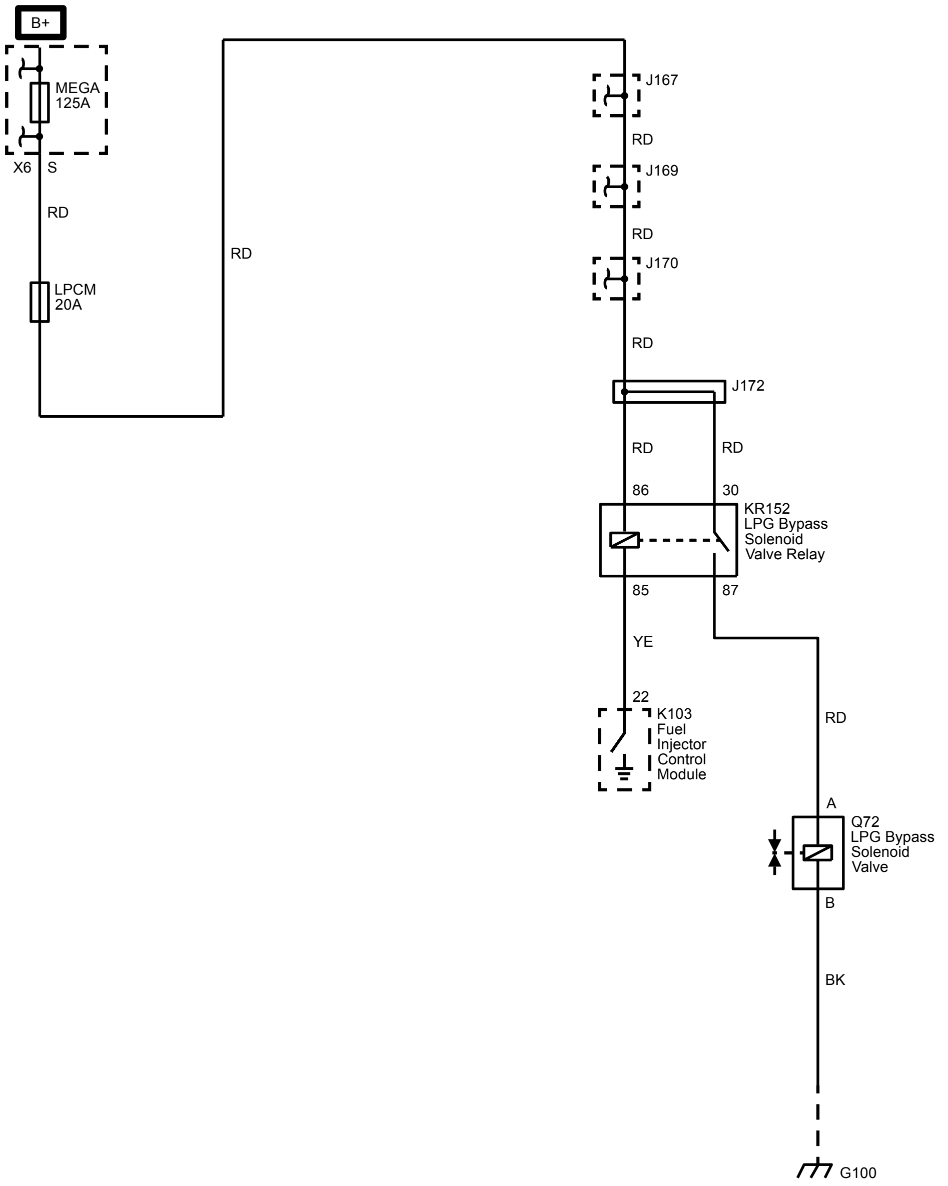

B+
X50A
Fuse Block -
Underhood
30
85
KR23A
Fuel
Pump
Relay
87
86
F24UA
30 A
X2
B1
X1
C7
C8
Instrument
Cluster
Schematics
120
GY
1250
BK
465
D-GN/WH
1589
PU
D
A7
Fuel Pump
and Level
Sensor
Assembly
M
A
X1
28
X3
64
K20
Engine
Control
Module
150
BK
G400
G102

Fuel Controls - Compressed Natural Gas (LC8 with FHZ)

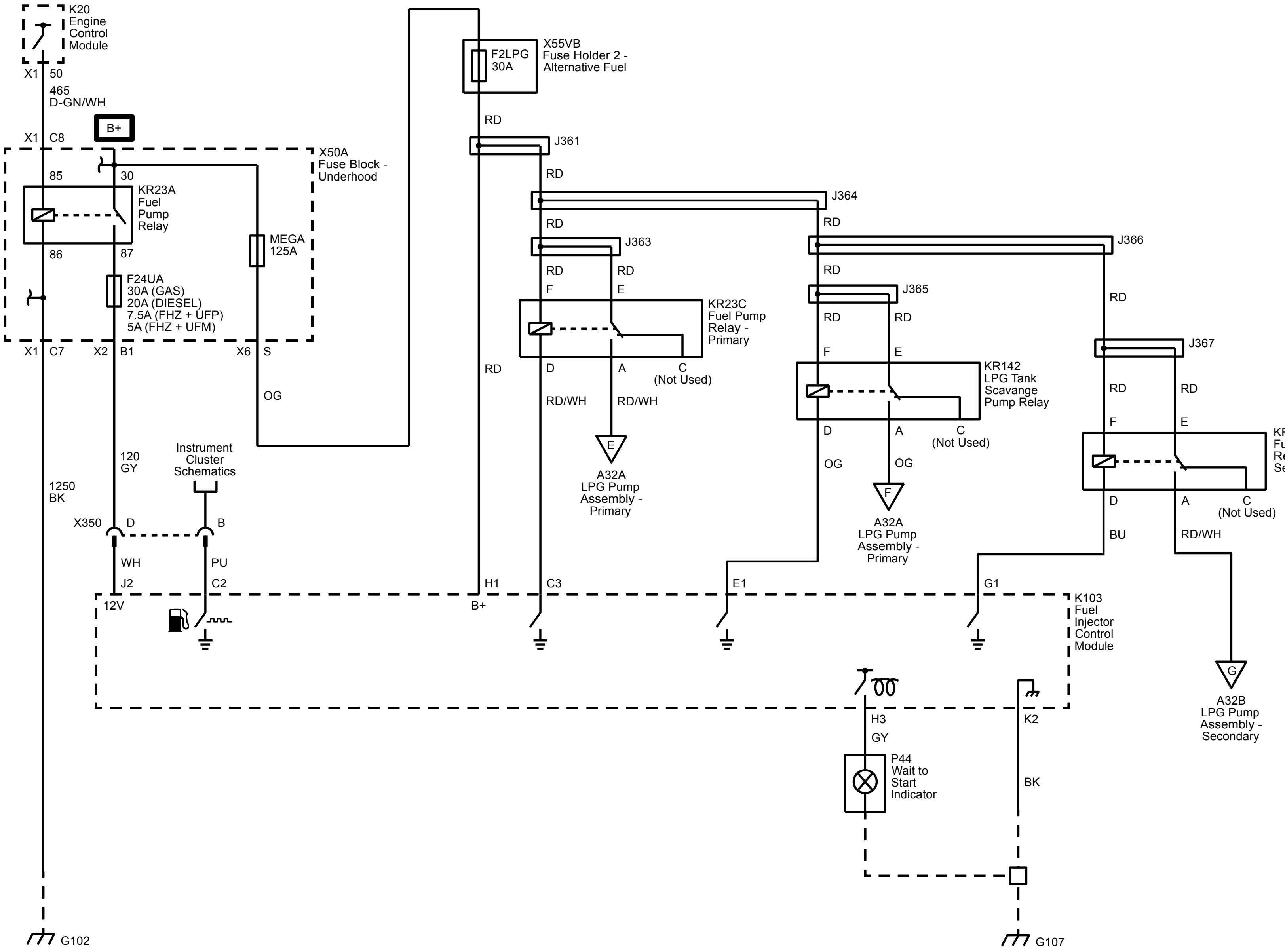

IGN II/III
B+
X54E Fuse Block - CNG
F6UE 2A
F3UE 2A
F4UE 2A
F5UE 2A
F1UE 2A
F2UE 2A
F7UE 5A
GN
GY
RD
X96 Alternative Fuel System Data Connector
3
(UFP)
Q68B CNG Cut-Off Solenoid Valve 2
Q68C CNG Cut-Off Solenoid Valve 3
Q68D CNG Cut-Off Solenoid Valve 4
Q69 CNG High Pressure Regulator Solenoid Valve
Q68A CNG Cut-Off Solenoid Valve 1
2
1
GN/BK
32
48
20
16
17
18
14
15
12
12V
B+
K103 Fuel Injector Control Module
19
39
47
BK
G111

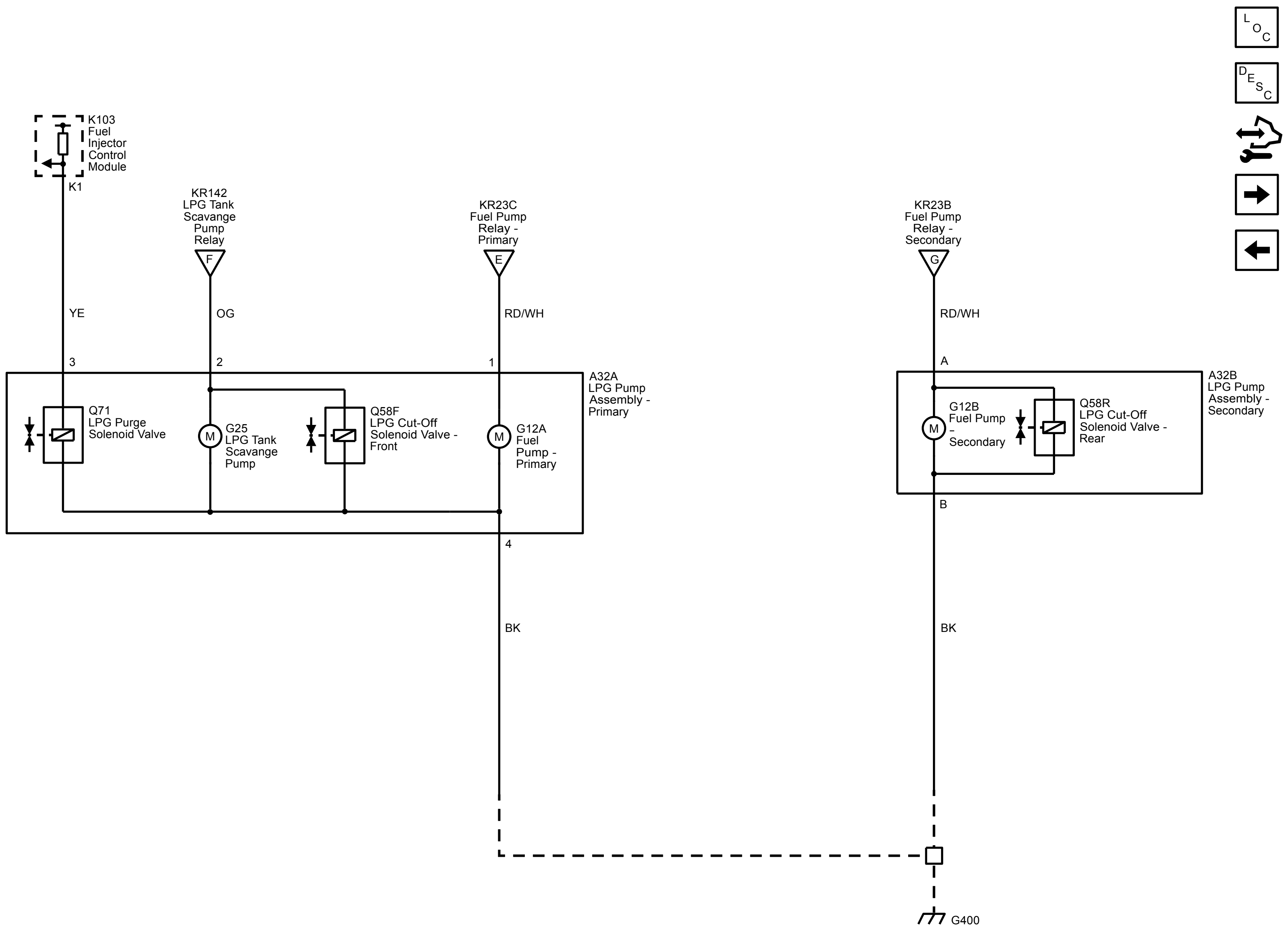

K20
Engine
Control
Module
X1 50
465
D-GN/WH
B+
X1 C8
85
30
KR23A
Fuel
Pump
Relay
86
87
X50A
Fuse Block -
Underhood
MEGA
125A
F24UA
30A (GAS)
20A (DIESEL)
7.5A (FHZ + UFP)
5A (FHZ + UFM)
X1 C7
X2 B1
X6 S
120
GY
X350 D
GY
J431
RD
X180 A
RD
GY
J432
RD
GY
A
G12
Fuel
Pump
M
B
BK
A
Q53
Fuel Cut-
Off
Solenoid
Valve
B
BK
J130
BK
X350 A
150
BK
1250
BK
G102
G400
J167
RD
LPCM
20A
RD
RD
J169
RD
RD
J170
RD
A
G34
Evaporative
Emission
System Leak
Detection
Pump
M
B
WH
J171
RD/BK
RD
1M Ω
RD/BK
J168
RD
RD
RD
86
30
KR143
Wait to
Start
Indicator
Relay
85
87
RD
A
P44
Wait to
Start
Indicator
B
GY
2
12V
13
B+
16
B+
24
12
K103
Fuel
Injector
Control
Module
5V
5
18
17
1
14
GN
RD
WH
BK
BK
BK
4
3
B190
LPG
Pressure
and
Temperature
Sensor
P
U
2
1
G100
L O C
D E S C

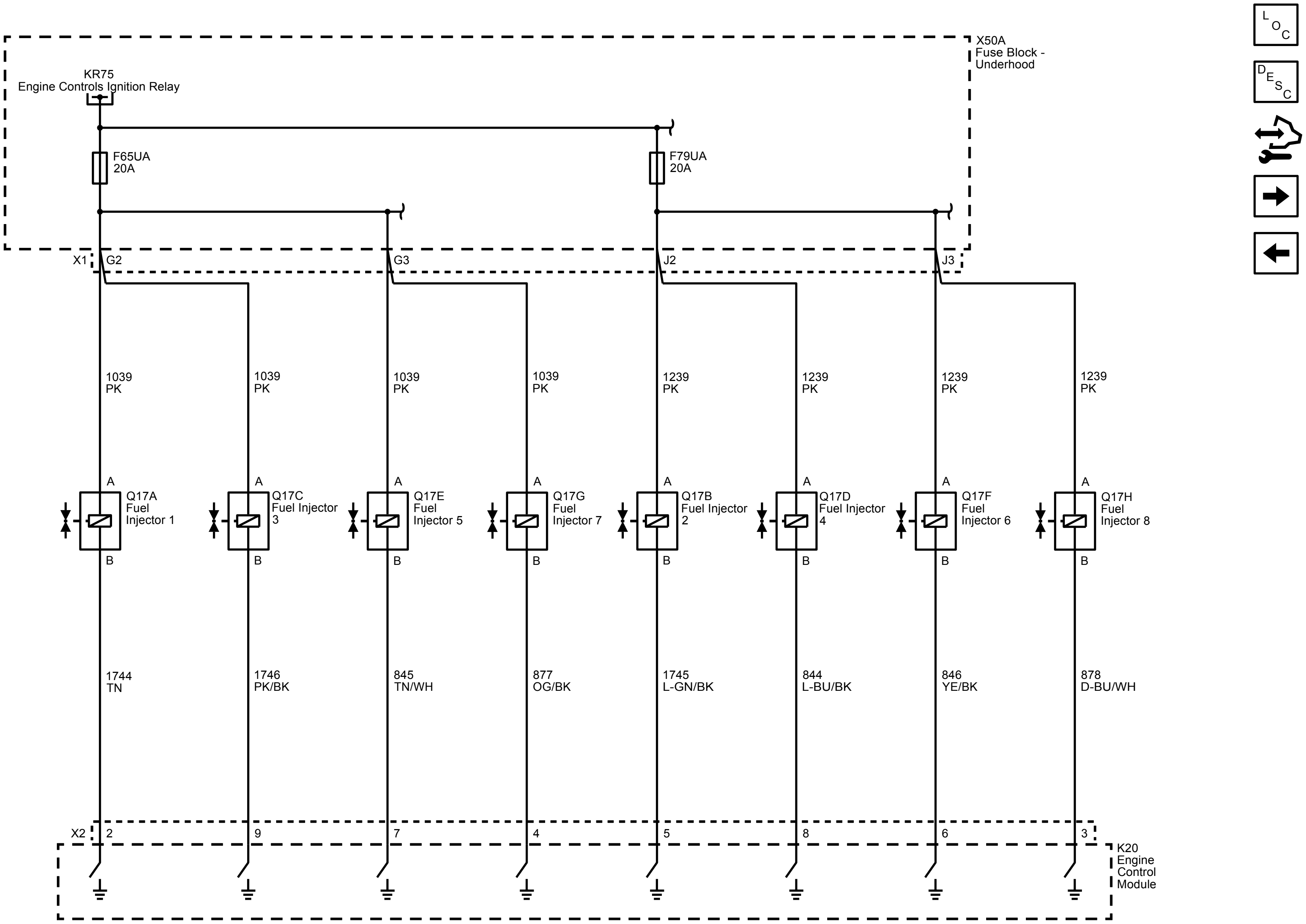
Fuel Controls - LPG Bypass Solenoid (KO7 with UFM)


B+
MEGA
125A
X6
S
RD
LPCM
20A
RD
J167
RD
J169
RD
J170
RD
J172
RD
RD
86
30
KR152
LPG Bypass
Solenoid
Valve Relay
85
87
YE
22
K103
Fuel
Injector
Control
Module
RD
A
Q72
LPG Bypass
Solenoid
Valve
B
BK
G100

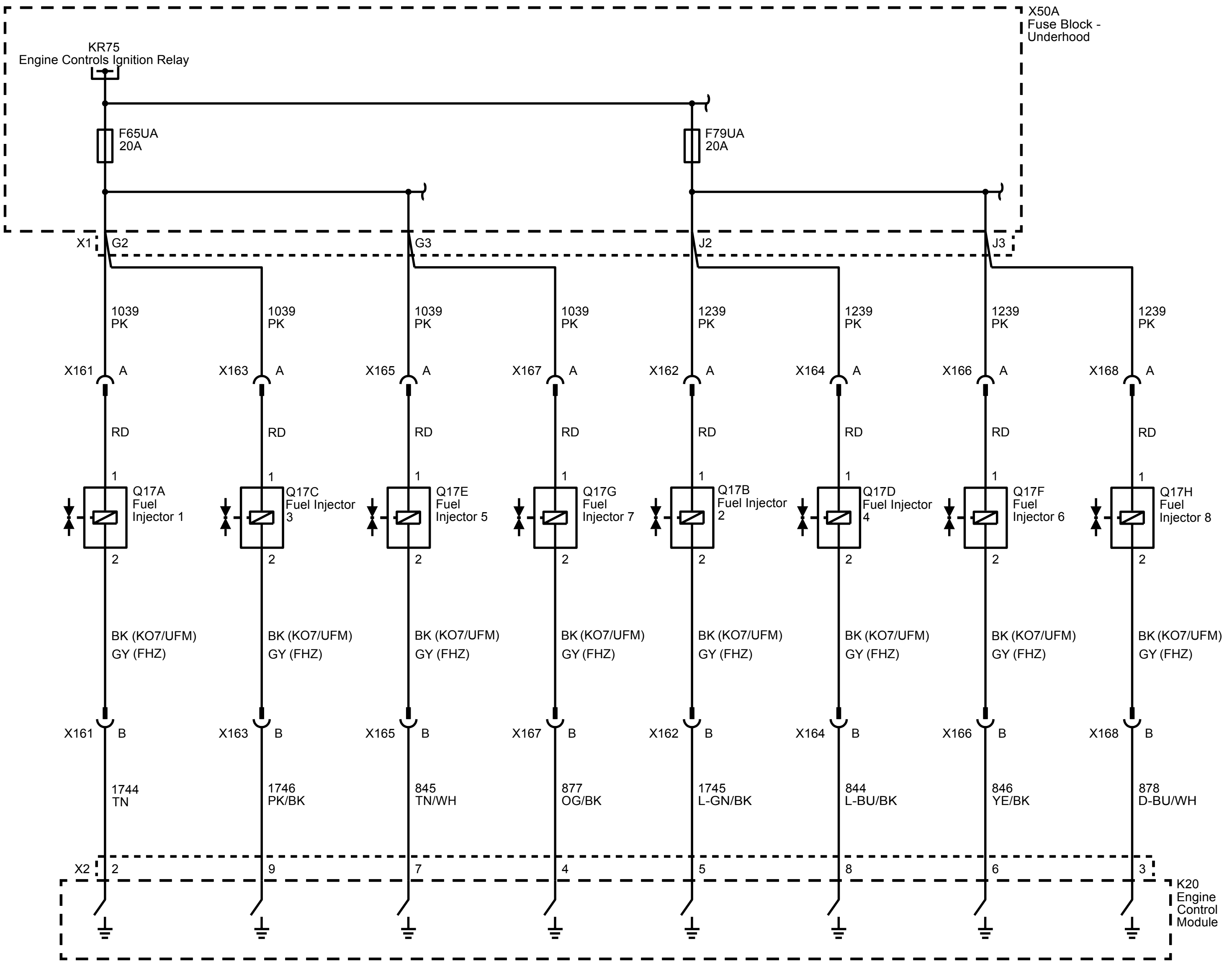
Fuel Controls - Liquified Propane Gas (KO7 with UFP) 1 of 2


K20
Engine
Control
Module
X1 50
465
D-GN/WH
B+
X1 C8
X50A
Fuse Block -
Underhood
85
30
KR23A
Fuel
Pump
Relay
86
87
MEGA
125A
F24UA
30A (GAS)
20A (DIESEL)
7.5A (FHZ + UFP)
5A (FHZ + UFM)
X1 C7
X2 B1
X6 S
OG
120
GY
1250
BK
Instrument
Cluster
Schematics
X350 D
B
WH
PU
J2
C2
12V
G102
F2LPG
30A
X55VB
Fuse Holder 2 -
Alternative Fuel
RD
J361
RD
J364
RD
J363
RD
RD
F
E
KR23C
Fuel Pump
Relay -
Primary
RD
D
A
C
(Not Used)
RD/WH
RD/WH
E
A32A
LPG Pump
Assembly -
Primary
RD
J366
RD
J365
RD
RD
F
E
KR142
LPG Tank
Scavange
Pump Relay
D
A
C
(Not Used)
OG
OG
F
A32A
LPG Pump
Assembly -
Primary
RD
J367
RD
RD
F
E
KR23B
Fuel Pump
Relay -
Secondary
D
A
C
(Not Used)
BU
RD/WH
H1
B+
C3
E1
G1
K103
Fuel
Injector
Control
Module
G
A32B
LPG Pump
Assembly -
Secondary
H3
GY
K2
P44
Wait to
Start
Indicator
BK
G107

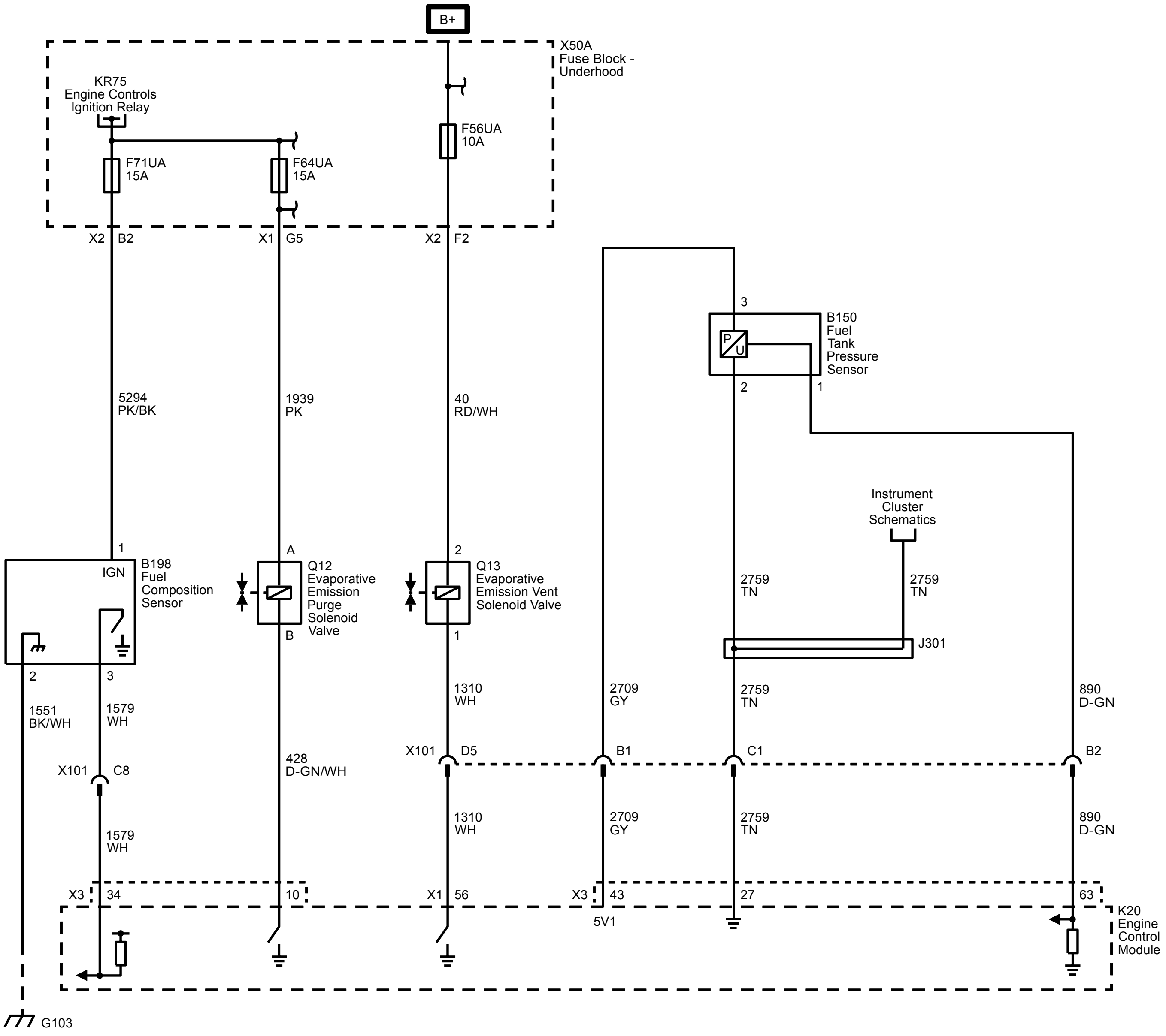

LOC
DESC
K103
Fuel
Injector
Control
Module
K1
KR142
LPG Tank
Scavange
Pump
Relay
F
KR23C
Fuel Pump
Relay -
Primary
E
KR23B
Fuel Pump
Relay -
Secondary
G
YE
OG
RD/WH
RD/WH
3
2
1
A
A32A
LPG Pump
Assembly -
Primary
Q71
LPG Purge
Solenoid Valve
G25
LPG Tank
Scavange
Pump
Q58F
LPG Cut-Off
Solenoid Valve -
Front
G12A
Fuel
Pump -
Primary
M
M
M
A32B
LPG Pump
Assembly -
Secondary
G12B
Fuel Pump
-
Secondary
Q58R
LPG Cut-Off
Solenoid Valve -
Rear
4
B
BK
BK
G400


X50A
Fuse Block - Underhood
KR75
Engine Controls Ignition Relay
F65UA
20A
F79UA
20A
X1
G2
G3
J2
J3
1039
PK
1039
PK
1039
PK
1039
PK
1239
PK
1239
PK
1239
PK
1239
PK
A
Q17A
Fuel
Injector 1
B
A
Q17C
Fuel Injector
3
B
A
Q17E
Fuel
Injector 5
B
A
Q17G
Fuel
Injector 7
B
A
Q17B
Fuel Injector
2
B
A
Q17D
Fuel Injector
4
B
A
Q17F
Fuel
Injector 6
B
A
Q17H
Fuel
Injector 8
B
1744
TN
1746
PK/BK
845
TN/WH
877
OG/BK
1745
L-GN/BK
844
L-BU/BK
846
YE/BK
878
D-BU/WH
X2
2
9
7
4
5
8
6
3
K20
Engine
Control
Module
LOC
DESC

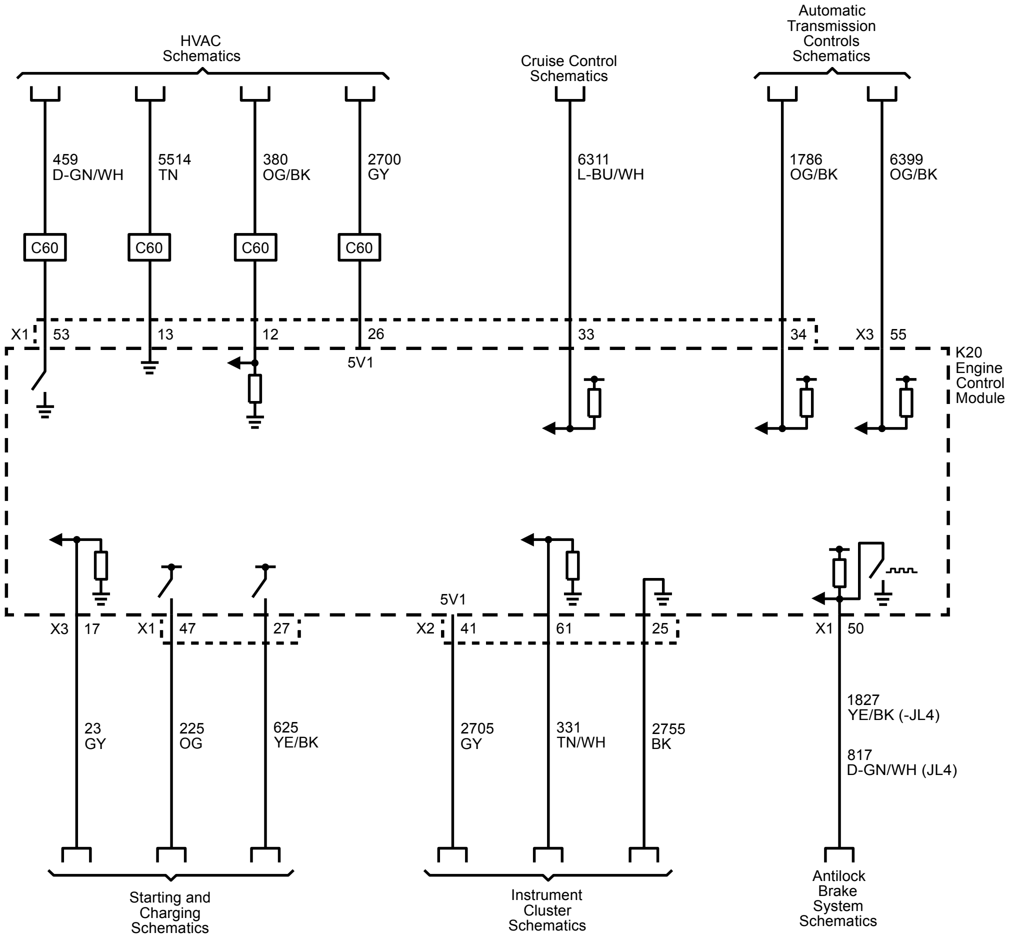
Fuel Controls - Fuel Injectors (FHZ, or KO7 with UFM)


X50A Fuse Block - Underhood
KR75 Engine Controls Ignition Relay
F65UA 20A
F79UA 20A
X1
G2
G3
J2
J3
1039 PK
1239 PK
X161 A
X163 A
X165 A
X167 A
X162 A
X164 A
X166 A
X168 A
RD
1
2
Q17A Fuel Injector 1
Q17C Fuel Injector 3
Q17E Fuel Injector 5
Q17G Fuel Injector 7
Q17B Fuel Injector 2
Q17D Fuel Injector 4
Q17F Fuel Injector 6
Q17H Fuel Injector 8
BK (KO7/UFM)
GY (FHZ)
X161 B
X163 B
X165 B
X167 B
X162 B
X164 B
X166 B
X168 B
1744 TN
1746 PK/BK
845 TN/WH
877 OG/BK
1745 L-GN/BK
844 L-BU/BK
846 YE/BK
878 D-BU/WH
X2
2
9
7
4
5
8
6
3
K20 Engine Control Module

Fuel Controls - EVAP Controls


B+
X50A
Fuse Block -
Underhood
KR75
Engine Controls
Ignition Relay
F71UA
15A
F64UA
15A
F56UA
10A
X2
B2
X1
G5
X2
F2
3
B150
Fuel
Tank
Pressure
Sensor
P
U
2
1
5294
PK/BK
1939
PK
40
RD/WH
Instrument
Cluster
Schematics
1
B198
Fuel
Composition
Sensor
IGN
A
Q12
Evaporative
Emission
Purge
Solenoid
Valve
B
2
Q13
Evaporative
Emission Vent
Solenoid Valve
1
2759
TN
2759
TN
J301
2
3
1551
BK/WH
1579
WH
X101
C8
1579
WH
428
D-GN/WH
1310
WH
2709
GY
2759
TN
890
D-GN
X101
D5
B1
C1
B2
1310
WH
2709
GY
2759
TN
890
D-GN
X3
34
10
X1
56
X3
43
27
63
5V1
K20
Engine
Control
Module
G103

Controlled/Monitored Subsystem References


HVAC Schematics
Cruise Control Schematics
Automatic Transmission Controls Schematics
459 D-GN/WH
5514 TN
380 OG/BK
2700 GY
6311 L-BU/WH
1786 OG/BK
6399 OG/BK
C60
C60
C60
C60
X1
53
13
12
26
5V1
33
34
X3
55
K20 Engine Control Module
X3
17
X1
47
27
5V1
X2
41
61
25
X1
50
23 GY
225 OG
625 YE/BK
2705 GY
331 TN/WH
2755 BK
1827 YE/BK (-JL4)
817 D-GN/WH (JL4)
Starting and Charging Schematics
Instrument Cluster Schematics
Antilock Brake System Schematics

Description and Operation

Engine Control Module Description

The Engine Control Module (ECM) interacts with many emission related components and systems, and monitors emission related components and systems for deterioration. OBD II diagnostics monitor the system performance and a diagnostic trouble code (DTC) sets if the system performance degrades. The ECM is part of a network and communicates with various other vehicle control modules.

Malfunction indicator lamp (MIL) operation and DTC storage are dictated by the DTC type. A DTC is ranked as a Type A or Type B if the DTC is emissions related. Type C is a non-emissions related DTC.

The ECM is the control center of the engine controls system. Review the components and wiring diagrams in order to determine which systems are controlled by the ECM.

The ECM constantly monitors the information from various sensors and other inputs, and controls the systems that affect engine performance and emissions. The ECM also performs diagnostic tests on various parts of the system and can turn on the MIL when it recognizes an operational problem that affects emissions. When the ECM detects a malfunction, the ECM stores a DTC. The condition area is identified by the particular DTC that is set. This aids the technician in making repairs.

ECM Function

The ECM can supply 5 V or 12 V to various sensors or switches. This is done through pull-up resistors to regulated power supplies within the ECM. In some cases, even an ordinary shop voltmeter will not give an accurate reading due to low input resistance. Therefore, a digital multimeter (DMM) with at least 10 megaohms input impedance is required in order to ensure accurate voltage readings.

The ECM controls the output circuits by controlling the ground or the power feed circuit through transistors or a device called an output driver module.

EEPROM

The electronically erasable programmable read only memory (EEPROM) is an integral part of the ECM. The EEPROM contains program and calibration information that the ECM needs in order to control engine operation.

Special equipment, as well as the correct program and calibration for the vehicle, are required in order to reprogram the ECM.

Data Link Connector (DLC)

The data link connector (DLC) provides serial data communication for ECM diagnosis. This connector allows the technician to use a scan tool in order to monitor various serial data parameters, and display DTC information. The DLC is located inside the driver's compartment, underneath the instrument panel.

Malfunction Indicator Lamp (MIL)

The malfunction indicator lamp (MIL) is inside the instrument panel cluster (IPC). The MIL is controlled by the ECM and illuminates when the ECM detects a condition that affects vehicle emissions.

ECM Service Precautions

The ECM, by design, can withstand normal current draws that are associated with vehicle operations. However, care must be used in order to avoid overloading any of these circuits. When testing for opens or shorts, do not ground or apply voltage to any of the ECM circuits unless the diagnostic procedure instructs you to do so. These circuits should only be tested with a DMM unless the diagnostic procedure instructs otherwise.

Emissions Diagnosis For State I/M Programs

This OBD II equipped vehicle is designed to diagnose any conditions that could lead to excessive levels of the following emissions:

- Hydrocarbons (HC)
- Carbon monoxide (CO)
- Oxides of nitrogen (NOx)
- Evaporative emission (EVAP) system losses

Should this vehicle's on-board diagnostic system (ECM) detect a condition that could result in excessive emissions, the ECM turns ON the MIL and stores a DTC that is associated with the condition.

Aftermarket (Add-On) Electrical And Vacuum Equipment

Caution: Do not attach add-on vacuum operated equipment to this vehicle. The use of add-on vacuum equipment may result in damage to vehicle components or systems.

Caution: Connect any add-on electrically operated equipment to the vehicle's electrical system at the 12 V battery (power and ground) in order to prevent damage to the vehicle.

Aftermarket, add-on, electrical and vacuum equipment is defined as any equipment installed on a vehicle after leaving the factory that connects to the vehicle's electrical or vacuum systems. No allowances have been made in the vehicle design for this type of equipment.

Add-on electrical equipment, even when installed to these strict guidelines, may still cause the powertrain system to malfunction. This may also include equipment not connected to the vehicle electrical system, such as portable telephones and radios. Therefore, the first step in diagnosing any powertrain condition is to eliminate all of the aftermarket electrical equipment from the vehicle. After this is done, if the problem still exists, the problem may be diagnosed in the normal manner.

Electrostatic Discharge (ESD) Damage

Note: In order to prevent possible electrostatic discharge damage to the ECM, DO NOT touch the connector pins on the ECM.

The electronic components that are used in the control systems are often designed to carry very low voltage. These electronic components are susceptible to damage caused by electrostatic discharge. Less than 100 V of static electricity can cause damage to some electronic components. By comparison, it takes as much as 4,000 V for a person to even feel a static discharge.

There are several ways for a person to become statically charged. The most common methods of charging are by friction and by induction. An example of charging by friction is a person sliding across a car seat.

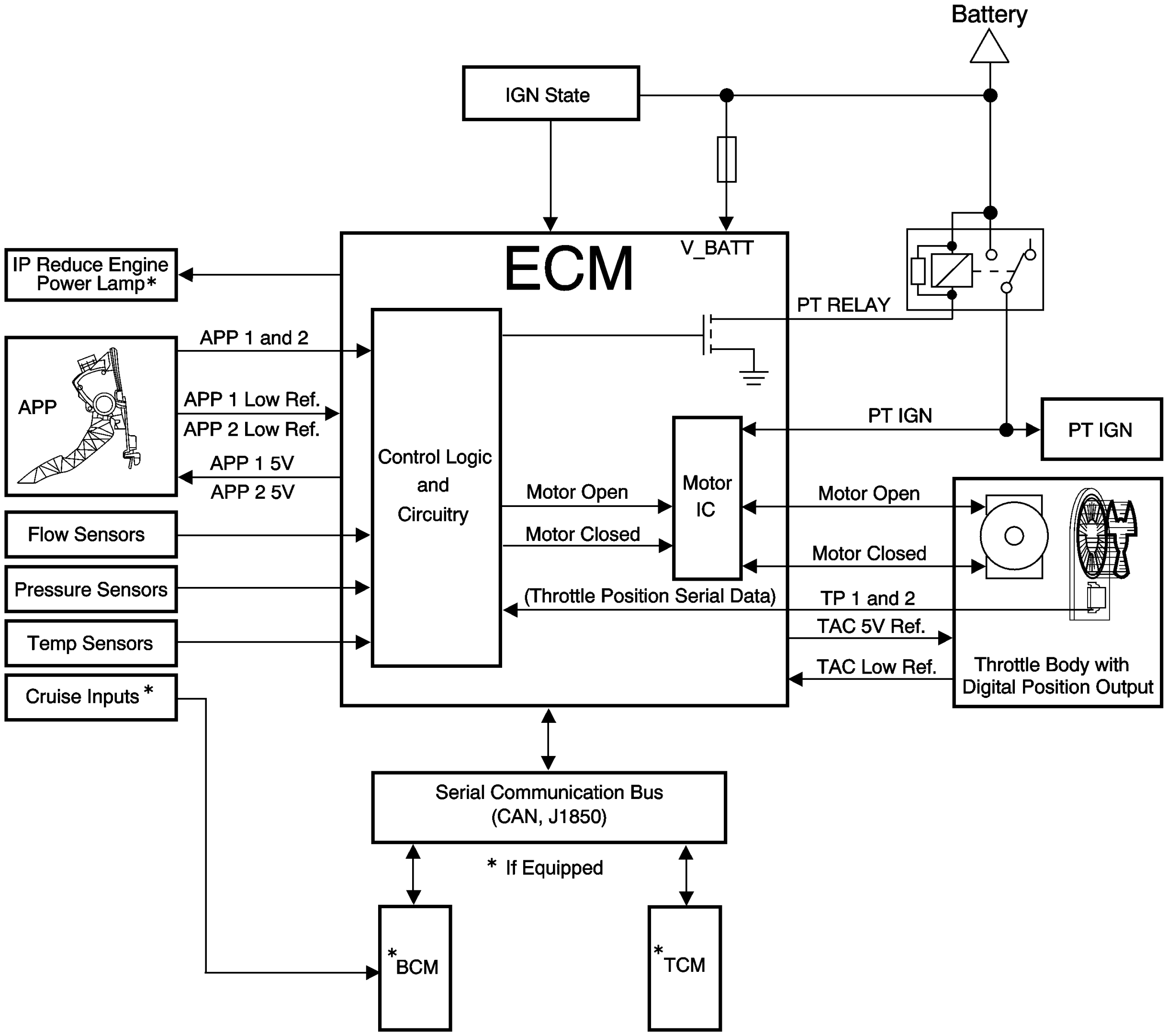
Charging by induction occurs when a person with well insulated shoes stands near a highly charged object and momentarily touches ground. Charges of the same polarity are drained off leaving the person highly charged with the opposite polarity. Static charges can cause damage, therefore, it is important to use care when handling and testing electronic components.

Emissions Control Information Label

The underhood Vehicle Emissions Control Information Label contains important emission specifications. This identifies the year, the displacement of the engine in liters, and the class of the vehicle.

This label is located in the engine compartment of every General Motors vehicle. If the label has been removed, it can be ordered from GM service parts operations (GMSPO).

Throttle Actuator Control (TAC) System Description


Battery
IGN State
V_BATT
ECM
PT RELAY
IP Reduce Engine Power Lamp*
APP
APP 1 and 2
APP 1 Low Ref.
APP 2 Low Ref.
APP 1 5V
APP 2 5V
Control Logic and Circuitry
PT IGN
PT IGN
Motor Open
Motor Closed
Motor IC
Motor Open
Motor Closed
Flow Sensors
Pressure Sensors
Temp Sensors
Cruise Inputs *
(Throttle Position Serial Data)
TP 1 and 2
TAC 5V Ref.
TAC Low Ref.
Throttle Body with Digital Position Output
Serial Communication Bus (CAN, J1850)
* If Equipped
*BCM
*TCM

The engine control module (ECM) is the control center for the throttle actuator control (TAC) system. The ECM determines the driver's intent based on input from the accelerator pedal position sensors, then calculates the appropriate throttle response based on the throttle position sensors. The ECM achieves throttle positioning by providing a pulse width modulated voltage to the throttle actuator motor. The throttle blade is spring loaded in both directions, and the default position is slightly open.

Modes Of Operation

Normal Mode

During the operation of the TAC system, several modes, or functions, are considered normal. The following modes may be entered during normal operations:

- Minimum pedal value—At key-up, the ECM updates the learned minimum pedal value.
- Minimum throttle position values—At key-up, the ECM updates the learned minimum throttle position value. In order to learn the minimum throttle position value, the throttle blade is moved to the Closed position.
- Ice break mode—If the throttle blade is not able to reach a predetermined minimum throttle position, the ice break mode is entered. During the ice break mode, the ECM commands the maximum pulse width several times to the throttle actuator motor in the closing direction.
- Battery saver mode—After a predetermined time without engine speed, the ECM commands the battery saver mode. During the battery saver mode, the TAC module removes the voltage from the motor control circuits, which removes the current draw used to maintain the idle position and allows the throttle to return to the spring loaded default position.

Reduced Engine Power Mode

When the ECM detects a condition with the TAC system, the ECM may enter a reduced engine power mode. Reduced engine power may cause one or more of the following conditions:

- Acceleration limiting—The ECM will continue to use the accelerator pedal for throttle control, however, the vehicle acceleration is limited.
- Limited throttle mode—The ECM will continue to use the accelerator pedal for throttle control, however, the maximum throttle opening is limited.
- Throttle default mode—The ECM will turn OFF the throttle actuator motor, and the throttle will return to the spring loaded default position.
- Forced idle mode—The ECM will perform the following actions:
  - Limit engine speed to the idle position
  - Ignore the accelerator pedal input.

- Engine shutdown mode—The ECM will disable fuel and de-energize the throttle actuator.

Throttle/Idle Learn

The engine control module (ECM) learns the airflow through the throttle body to ensure the correct idle. The learned airflow values are stored within the ECM. These values are learned to adjust for production variation and will continuously learn during the life of the vehicle to compensate for reduced airflow due to throttle body coking. Anytime the throttle body airflow rate changes, for example due to cleaning or replacing, the values must be relearned.

An engine that had a heavily coked throttle body that has been cleaned or replaced may take several drive cycles to unlearn the coking. To accelerate the process, the scan tool has the ability to reset all learned values back to zero. A new ECM will also have values set to zero.

The idle may be unstable or a DTC may set if the learned values do not match the actual airflow.

A un-metered air leak in the induction system or a small vacuum leak may not set a DTC. If the condition goes undetected, the ECM may learn an incorrect Throttle Body Idle Airflow Compensation value over time. The incorrectly learned value may cause various symptoms to occur such as rough or unstable idle speeds, and/or engine stall. If this condition is detected and repaired it will be necessary perform the Idle Learn procedure to ensure any symptoms are corrected.

Camshaft Actuator System Description

Camshaft Position (CMP) Actuator System

The camshaft (CMP) actuator system is an electro-hydraulic operated device used for a variety of engine performance and operational enhancements. These enhancements include lower emission output through exhaust gas dilution of the intake charge in the combustion chamber, a broader engine torque range, and improved fuel economy. The CMP actuator system accomplishes this by, changing the angle or timing of the camshaft, relative to the crankshaft position. The CMP actuator simply allows earlier or later intake and exhaust valve opening, during the four stroke engine cycle. The CMP actuator cannot vary the duration of valve opening, or the valve lift.

During engine Off, engine idling conditions, and engine shutdown, the camshaft actuator is held in the park position. Internal to the CMP actuator assembly is a return spring and a locking pin. During non-phasing modes of the camshaft, the return spring rotates the camshaft back to the park position, and the locking pin retains the CMP actuator sprocket to the camshaft. The engine control module (ECM) can only command the CMP actuator to retard the valve timing from the park position, or advance the valve timing back to the park position.

CMP Actuator System Operation

The camshaft position (CMP) actuator system is controlled by the engine control module (ECM). The ECM sends a pulse width modulated, signal to the CMP actuator solenoid to control the amount of pressurized engine oil, into the CMP actuator. A low reference circuit, or ground wire between the CMP actuator solenoid and the ECM completes the electrical circuit. To regulate the pressurized engine oil into the CMP actuator, the solenoid uses electromagnetic force on the solenoid pintle to pulse the oil control spool valve. The pressurized engine oil is sent to unseat the locking pin, and to the vane and rotor assembly of the CMP actuator, to either retard or advance the valve timing. The ECM will control the amount of On time applied to the solenoid, through the signal from the ECM.

The ECM uses the following inputs before assuming control of the CMP actuator, and to calculate the optimum valve timing.

- Engine speed
- Manifold absolute pressure (MAP)
- Throttle position angle
- Camshaft position sensor (CMP)
- Crankshaft position sensor (CKP)
- Crankshaft/camshaft correlation
- Engine coolant temperature (ECT)
- Closed loop fuel control
- Engine oil pressure (EOP)
- Engine oil level
- CMP actuator solenoid circuit state

Fuel System Description

Fuel System Overview

The Fuel System is an electronic returnless on-demand design. A returnless fuel system reduces the internal temperature of the fuel tank by not returning hot fuel from the engine to the fuel tank. Reducing the internal temperature of the fuel tank results in lower evaporative emissions.

An electric turbine style fuel pump attaches to the fuel sender assembly inside the fuel tank. The fuel pump supplies high pressure fuel through the fuel filter and the fuel feed pipe to the fuel injection system. The fuel pump provides fuel at a higher rate of flow than is needed by the fuel injection system. The fuel pump also supplies fuel to a venturi pump located on the bottom of the fuel sender assembly. The function of the venturi pump is to fill the fuel sender assembly reservoir. The fuel pump and sender assembly contains a reverse flow check valve. The check valve maintains fuel pressure in the fuel feed pipe and the fuel rail in order to prevent long cranking times.

E85 Flex Fuel Description

Some E85 compatible vehicles no longer use an alcohol sensor to determine and adjust for the alcohol content of the fuel in the tank. Instead, the vehicle calculates the alcohol content of the fuel through measured adjustments.

The ethanol calculation occurs with the engine running after a refueling event has been detected via a measured change in the fuel level sender output. The virtual flex fuel sensor (V-FFS) algorithm temporarily closes the canister purge valve for a few seconds and monitors information from the closed loop fuel trim system to calculate the ethanol content. This logic executes several times until the ethanol calculation is deemed to be stable. This may take several minutes under low fuel flow conditions such as idle, or a shorter time during higher fuel flow, off-idle conditions.

Air-fuel ratios and the corresponding ethanol percentage are updated following each purge-off sequence. The fuel alcohol content percentage value can be read on a scan tool.

When an E85 compatible vehicle is built, an ECM or PCM replaced, or if the learned alcohol content has been reset with a scan tool the fuel system will need to contain ASTM gasoline with 10 percent or less ethanol content.

A minimum of 11 liters (3 gallons) must be put in the tank in order for the vehicle to recognize a re-fueling event. It is not necessary to turn the ignition OFF in order to have the re-fueling event recognized, however local safety regulations should be followed.

After the re-fueling event, the system registers the amount of fuel that was added, relative to the amount that was in the tank. Reading fuel trim and O2 sensor activity, the system determines if the fuel added was either ASTM Gasoline or ASTM E85. Based on that determination, the system adjusts to the expected alcohol mix in the fuel tank, and then the fuel trim and O2 sensor activity fine tunes the adjustments. The system must remain in closed loop in order for this adjustment to occur. Numerous short trips after switching from gasoline to E85, or E85 to gasoline, can result in driveability symptoms due to the inability of the system to adjust for fuel composition by not attaining closed loop operation.

Switching Between Gasoline and E85

For V-FFS equiped vehicles, no special precautions need to be taken when switching back and forth between gasoline and E85 other than re-fueling events must be 11 liters (3 gallons) or greater, and the vehicle must remain in closed loop long enough, usually by the time the engine has maintained full operating temperature, to calculate the composition of the new blend in the tank.

Flex Fuel Sensor (L96, FHS)

The flex fuel sensor measures the ethanol-gasoline ratio of the fuel being used in a flexible fuel vehicle. Flexible fuel vehicles can be operated with a blend of ethanol and gasoline, up to 85 percent ethanol. In order to adjust the ignition timing and the fuel quantity to be injected, the engine management system requires information about the percentage of ethanol in the fuel.

The flex fuel sensor uses quick-connect style fuel connections, an incoming fuel connection, and an outgoing fuel connection. All fuel passes through the flex fuel sensor before continuing on to the fuel rail. The flex fuel sensor measures the fuel alcohol content, and sends an electrical signal to the engine control module (ECM) to indicate ethanol percentage.

The flex fuel sensor has a three-wire electrical harness connector. The three wires provide a ground circuit, a power source, and a signal output to the ECM. The power source is battery positive voltage and the ground circuit connects to an engine ground. The signal circuit carries the ethanol percentage via a frequency signal.

Fuel Pump Flow Control Module (FPCM)

The fuel pump flow control module (FPCM) is a serviceable GMLAN module. The FPCM receives the desired fuel pressure message from the engine control module (ECM) and controls the fuel pump located within the fuel tank to achieve the desired fuel pressure. The FPCM sends a 25 KHZ PWM signal to the fuel pump, and pump speed is changed by varying the duty cycle of this signal. Maximum current supplied to the fuel pump is 15 amps. A liquid fuel pressure sensor provides fuel pressure feedback to the FPCM.

Electronic Returnless Fuel System (ERFS)

The electronic returnless fuel system is a microprocessor controlled fuel delivery system which transports fuel from the tank to the fuel rails. It functions as an electronic replacement for a traditional, mechanical fuel pressure regulator. A pressure relief regulator valve within the fuel tank provides an added measure of over pressure protection. Desired fuel pressure is commanded by the engine control module (ECM), and transmitted to the FPCM via a GMLAN serial data message. A liquid fuel pressure sensor provides the feedback the FPCM requires for Closed Loop fuel pressure control.

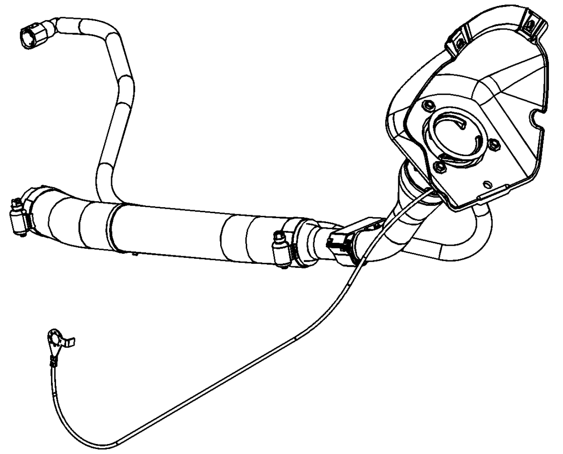
Liquid Fuel Pressure Sensor – With FPCM

The fuel pressure sensor is a serviceable 5-volt, 3-pin device. It is located on the fuel feed line forward of the fuel tank, and receives power and ground from the fuel pump flow control module (FPCM) through a vehicle wiring harness. The sensor provides a fuel pressure signal to the FPCM, which is used to provide Closed Loop fuel pressure control.

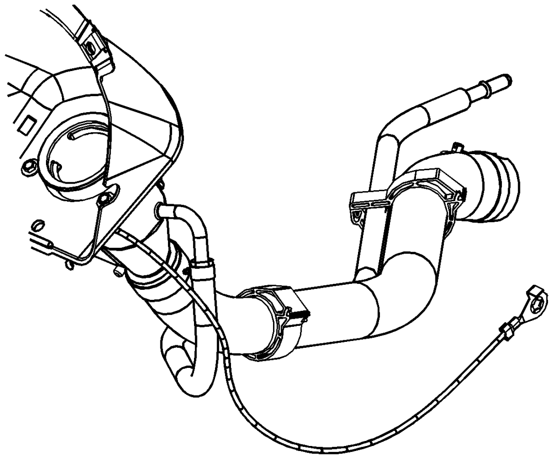
Fuel Tanks

The fuel tanks store the fuel supply. The front fuel tank is located on the left side of the vehicle. On dual-tank applications, the secondary fuel tank is located in the rear of the vehicle above the spare tire. The fuel tanks are each held in place by 2 metal straps that attach to the frame. The fuel tanks are molded from high density polyethylene.

Fuel Fill Pipe

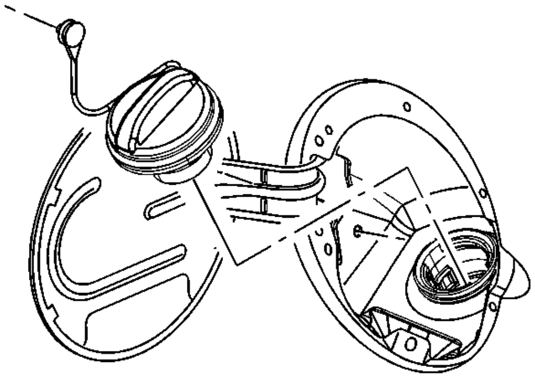


The fuel fill pipe has a built-in restrictor in order to prevent refueling with leaded fuel. When refueling dual tank applications, fuel is dispensed to both the front and rear fuel tanks at the same time. Once the fill vent is obstructed, fuel backs up the fill pipe and trips the dispensing nozzle.



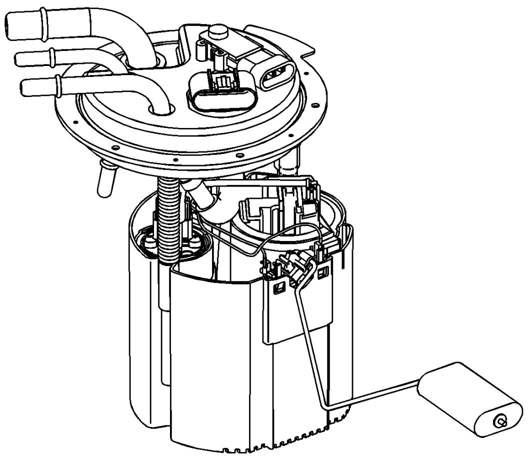
The front fuel tank vent runs into the rear tank to the top of the filler pipe assembly, which in turn vents to atmosphere. The fuel tank vent valves are connected and route to the canister to collect hydrocarbon emissions during operation of the vehicle.

Fuel Filler Cap



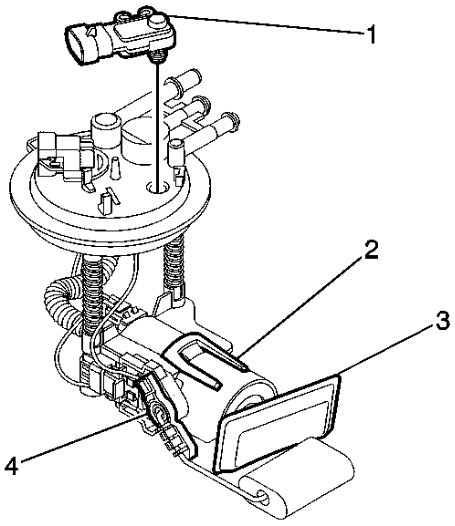
The fuel fill pipe has a tethered fuel filler cap. A torque-limiting device prevents the cap from being over tightened. To install the cap, turn the cap clockwise until you hear clicks. This indicates that the cap is correctly torqued and fully seated. A built-in device indicates that the fuel filler cap is fully seated. A fuel filler cap that is not fully seated may cause a malfunction in the emission system.

Fuel Tank Fuel Pump Module Assembly



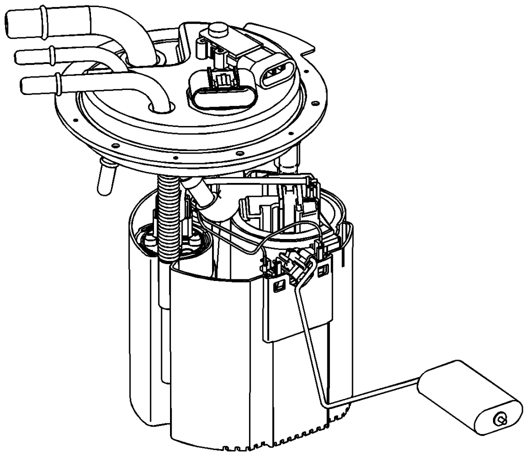
The front fuel tank fuel pump module on dual tank applications consists of the following major components:

- The fuel level sensor
- The fuel strainer
- The fuel filter
- The pressure relief regulator valve



The rear fuel tank fuel pump module on dual tank applications consists of the following major components:

- The fuel level sensor (4)
- The FTP sensor (1)
- The rear fuel pump (2)



The fuel tank fuel pump module assembly on single tank applications consists of the following major components:

- The fuel level sensor
- The fuel tank pressure (FTP) sensor
- The fuel strainer
- The fuel filter
- The pressure relief regulator valve

Fuel Level Sensor

The fuel level sensor consists of a float, a wire float arm, and a ceramic resistor cord. The position of the float arm indicates the fuel level. The fuel level sensor contains a variable resistor, which changes resistance in correspondence to the amount of fuel in the fuel tank. The engine control module (ECM) sends the fuel level information via the class 2 circuit to the instrument panel (I/P) cluster. This information is used for the I/P fuel gauge and the low fuel warning indicator, if applicable. The ECM also monitors the fuel level input for various diagnostics.

Fuel Pump

The fuel pump is mounted in the fuel tank fuel pump module assembly reservoir. The fuel pump is an electric high pressure pump. Fuel is pumped to the fuel injection system at a pressure that is based on feedback from the fuel pressure sensor. The fuel pump delivers a constant flow of fuel to the engine during low fuel conditions and aggressive vehicle maneuvers. The fuel pump flex pipe acts to dampen the fuel pulses and noise generated by the fuel pump.

Pressure Relief Regulator Valve

The pressure relief regulator valve replaces the typical fuel pressure regulator used on a mechanical returnless fuel system. The pressure relief regulator valve is closed during normal vehicle operation. The pressure relief regulator vale is used to vent pressure during hot soaks and also functions as a fuel pressure regulator in the event of the fuel pump flow control module defaulting to 100 % pulse width modulation (PWM) of the fuel pump. Due to variation in fuel system pressures, the opening pressure for the pressure relief regulator vale is set higher than the pressure that is used on a mechanical returnless fuel system pressure regulator.

Fuel Strainer

The fuel strainer attaches to the lower end of the fuel tank fuel pump module. The fuel strainer is made of woven plastic. The functions of the fuel strainer are to filter contaminants and to wick fuel. Fuel stoppage at this point indicates that the fuel tank contains an abnormal amount of sediment.

Fuel Filter

The fuel filter is contained in the fuel tank fuel pump module assembly inside the fuel tank. The paper filter element of the fuel filter traps particles in the fuel that may damage the fuel injection system. The fuel filter housing is made to withstand maximum fuel system pressure, exposure to fuel additives, and changes in temperature. There is no service interval for fuel filter replacement.

Nylon Fuel Pipes

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Nylon pipes are constructed to withstand maximum fuel system pressure, exposure to fuel additives, and changes in temperature. Heat resistant rubber hose or corrugated plastic conduit protects the sections of the pipes that are exposed to chafing, to high temperatures, or to vibration.

Nylon fuel pipes are somewhat flexible and can be formed around gradual turns under the vehicle. However, if nylon fuel pipes are forced into sharp bends, the pipes kink and restrict the fuel flow. Also, once exposed to fuel, nylon pipes may become stiffer and are more likely to kink if bent too far. Take special care when working on a vehicle with nylon fuel pipes.

Quick-Connect Fittings

Quick-connect fittings provide a simplified means of installing and connecting fuel system components. The fittings consist of a unique female connector and a compatible male pipe end. O-rings, located inside the female connector, provide the fuel seal. Integral locking tabs inside the female connector hold the fittings together.

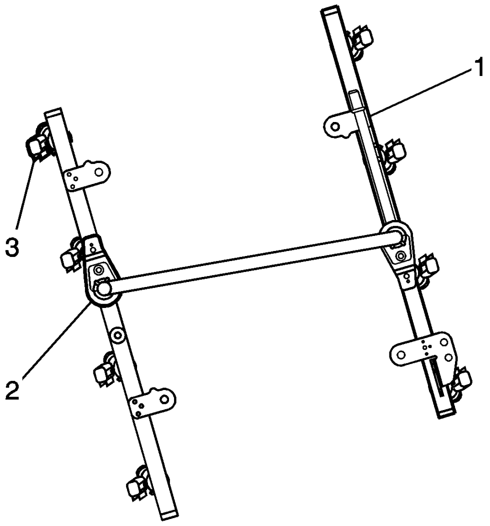
On-Board Refueling Vapor Recovery System (ORVR)

The On-Board Refueling Vapor Recovery System (ORVR) is an on-board vehicle system designed to recover fuel vapors during the vehicle refueling operation. The flow of liquid fuel down the fuel filler pipe provides a liquid seal which prevents vapor from leaving the fuel filler pipe. An evaporative emission (EVAP) pipe transports the fuel vapor to the EVAP canister for use by the engine.

Fuel Pipe O-Rings

O-rings seal the threaded connections in the fuel system. Fuel system O-ring seals are made of special material. Service the O-ring seals with the correct service part.

Fuel Rail Assembly



The fuel rail assembly attaches to the engine intake manifold. The fuel rail assembly performs the following functions:

- Positions the injectors (3) in the intake manifold
- Distributes fuel evenly to the injectors

Fuel Injectors

The fuel injector assembly is a solenoid device controlled by the engine control module (ECM) that meters pressurized fuel to a single engine cylinder. The ECM energizes the injector solenoid to open a normally closed ball valve. This allows the fuel to flow into the top of the injector, past the ball valve, and through a director plate at the injector outlet. The director plate has machined holes that control the fuel flow, generating a spray of finely atomized fuel at the injector tip. Fuel from the injector tip is directed at the intake valve, causing the fuel to become further atomized and vaporized before entering the combustion chamber. This fine atomization improves fuel economy and emissions.

Fuel Metering Modes of Operation

The engine control module (ECM) monitors voltages from several sensors in order to determine how much fuel to give the engine. The ECM controls the amount of fuel delivered to the engine by changing the fuel injector pulse width. The fuel is delivered under one of several modes.

Starting Mode

When the ignition is first turned ON, the ECM supplies voltage to the FPCM for 2 seconds. While this voltage is being received, the FPCM closes the ground switch of the fuel pump, and also supplies a varying voltage to the fuel tank fuel pump module in order to maintain the desired fuel rail pressure. The ECM calculates the air/fuel ratio based on inputs from the engine coolant temperature (ECT), mass air flow (MAF), manifold absolute pressure (MAP), and throttle position (TP) sensors. The system stays in starting mode until the engine speed reaches a predetermined RPM.

Clear Flood Mode

If the engine floods, clear the engine by pressing the accelerator pedal down to the floor and then crank the engine. When the TP sensor is at wide open throttle (WOT), the ECM reduces the fuel injector pulse width in order to increase the air to fuel ratio. The ECM holds this injector rate as long as the throttle stays wide open and the engine speed is below a predetermined RPM. If the throttle is not held wide open, the ECM returns to the starting mode.

Run Mode

The run mode has 2 conditions called Open Loop and Closed Loop. When the engine is first started and the engine speed is above a predetermined RPM, the system begins Open Loop operation. The ECM ignores the signal from the heated oxygen sensors (HO2S). The ECM calculates the air/fuel ratio based on inputs from the ECT, MAF, MAP, and TP sensors. The system stays in Open Loop until meeting the following conditions:

- Both front HO2S have varying voltage output, showing that both HO2S are hot enough to operate properly.
- The ECT sensor is above a specified temperature.
- A specific amount of time has elapsed after starting the engine.

Specific values for the above conditions exist for each different engine, and are stored in the electrically erasable programmable read-only memory (EEPROM). The system begins Closed Loop operation after reaching these values. In Closed Loop, the ECM calculates the air/fuel ratio, injector ON time, based upon the signal from various sensors, but mainly from the HO2S. This allows the air/fuel ratio to stay very close to 14.7:1.

Acceleration Mode

When the driver pushes on the accelerator pedal, air flow into the cylinders increases rapidly. To prevent possible hesitation, the ECM increases the pulse width to the injectors to provide extra fuel during acceleration. This is also known as power enrichment. The ECM determines the amount of fuel required based upon the TP, the ECT, the MAP, the MAF, and the engine speed.

Deceleration Mode

When the driver releases the accelerator pedal, air flow into the engine is reduced. The ECM monitors the corresponding changes in the TP, the MAP, and the MAF. The ECM shuts OFF fuel completely if the deceleration is very rapid, or for long periods, such as long, closed-throttle coast-down. The fuel shuts OFF in order to prevent damage to the catalytic converters.

Battery Voltage Correction Mode

When the battery voltage is low, the ECM compensates for the weak spark delivered by the ignition system in the following ways:

- Increasing the amount of fuel delivered
- Increasing the idle RPM
- Increasing the ignition dwell time

Fuel Cutoff Mode

The ECM cuts OFF fuel from the fuel injectors when the following conditions are met in order to protect the powertrain from damage and improve driveability:

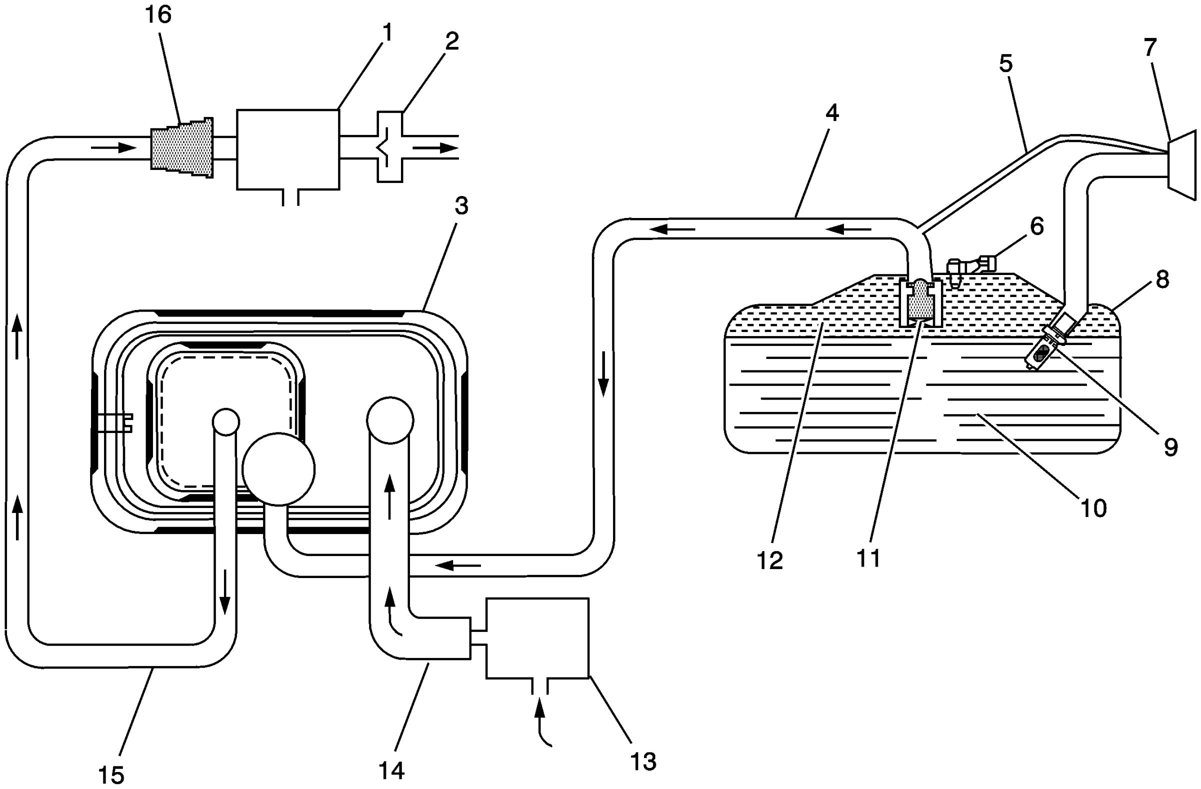
- The ignition is OFF. This prevents engine run-on.
- The ignition is ON but there is no ignition reference signal. This prevents flooding or backfiring.
- The engine speed is too high, above red line.
- The vehicle speed is too high, above rated tire speed.
- During an extended, high speed, closed throttle coast down—This reduces emissions and increases engine braking.
- During extended deceleration, in order to prevent damage to the catalytic converters

Fuel Trim

The engine control module (ECM) controls the air/fuel metering system in order to provide the best possible combination of driveability, fuel economy, and emission control. The ECM monitors the heated oxygen sensor (HO2S) signal voltage while in Closed Loop and regulates the fuel delivery by adjusting the pulse width of the fuel injectors based on this signal. The ideal fuel trim values are around 0 percent for both short term and long term fuel trim. A positive fuel trim value indicates the ECM is adding fuel in order to compensate for a lean condition by increasing the pulse width. A negative fuel trim value indicates that the ECM is reducing the amount of fuel in order to compensate for a rich condition by decreasing the pulse width. A change made to the fuel delivery changes the short term and long term fuel trim values. The short term fuel trim values change rapidly in response to the HO2S signal voltage. These changes fine tune the engine fueling. The long term fuel trim makes coarse adjustments to the fueling in order to re-center and restore control to short term fuel trim. A scan tool can be used to monitor the short term and long term fuel trim values. The long term fuel trim diagnostic is based on an average of several of the long term speed load learn cells. The ECM selects the cells based on the engine speed and engine load. If the ECM detects an excessive lean or rich condition, the ECM will set a fuel trim diagnostic trouble code (DTC).

Evaporative Emission Control System Description

Typical Evaporative Emission (EVAP) System Hose Routing Diagram



EVAP System Operation

The EVAP control system limits fuel vapors from escaping into the atmosphere. Fuel tank vapors are allowed to move from the fuel tank, due to pressure in the tank, through the EVAP vapor tube, into the EVAP canister. Carbon in the canister absorbs and stores the fuel vapors. Excess pressure is vented through the vent hose and EVAP vent solenoid valve to the atmosphere. The EVAP canister stores the fuel vapors until the engine is able to use them. At an appropriate time, the engine control module (ECM) will command the EVAP purge solenoid valve ON, allowing engine vacuum to be applied to the EVAP canister. With the normally open EVAP vent solenoid valve OFF, fresh air is drawn through the vent solenoid valve and the vent hose to the EVAP canister. Fresh air is drawn through the canister, pulling fuel vapors from the carbon. The air/fuel vapor mixture continues through the EVAP purge tube and EVAP purge solenoid valve into the intake manifold to be consumed during normal combustion. The ECM uses several tests to determine if the EVAP system is leaking or restricted.

Purge Solenoid Valve Leak Test

If the EVAP purge solenoid valve does not seal properly fuel vapors could enter the engine at an undesired time, causing driveability concerns. The ECM tests for this by commanding the EVAP purge solenoid valve OFF and the vent solenoid valve ON which seals the system. With the engine running, the ECM then monitors the fuel tank pressure sensor for an increase in vacuum. The ECM will set a DTC if a vacuum develops in the tank under these test conditions.

Large Leak Test

This diagnostic creates a vacuum condition in the EVAP system. When the enabling criteria has been met, the ECM commands the normally open EVAP vent solenoid valve closed and the EVAP purge solenoid valve open, creating a vacuum in the EVAP system. The ECM then monitors the fuel tank pressure sensor voltage to verify that the system is able to reach a predetermined level of vacuum within a set amount of time. Failure to achieve the expected level of vacuum indicates the presence of a large leak in the EVAP system or a restriction in the purge path. The ECM will set a DTC if it detects a weaker than expected vacuum level under these test conditions.

Canister Vent Restriction Test

If the EVAP vent system is restricted, fuel vapors will not be properly purged from the EVAP canister. The ECM tests this by commanding the EVAP purge solenoid valve ON while commanding the EVAP vent solenoid valve OFF, and then monitoring the fuel tank pressure sensor for an increase in vacuum. If the vacuum increases more than the expected amount, in a set amount of time, a fault will be logged by the ECM.

Small Leak Test

The engine off natural vacuum diagnostic is the small-leak detection diagnostic for the EVAP system. The engine off natural vacuum diagnostic monitors the EVAP system pressure with the ignition OFF. Because of this, it may be normal for the ECM to remain active for up to 40 min after the ignition is turned OFF. This is important to remember when performing a parasitic draw test on vehicles equipped with engine off natural vacuum.

When the vehicle is driven, the temperature rises in the tank due to heat transfer from the exhaust system. After the vehicle is parked, the temperature in the tank continues to rise for a period of time, then starts to drop. The engine off natural vacuum diagnostic relies on this temperature change, and the corresponding pressure change in a sealed system, to determine if an EVAP system leak is present.

The engine off natural vacuum diagnostic is designed to detect leaks as small as 0.51 mm (0.020 in).

EVAP System Components

The EVAP system consists of the following components:

EVAP Purge Solenoid Valve

The EVAP purge solenoid valve controls the flow of vapors from the EVAP system to the intake manifold. The purge solenoid valve opens when commanded ON by the ECM. This normally closed valve is pulse width modulated (PWM) by the ECM to precisely control the flow of fuel vapor to the engine. The valve will also be opened during some portions of the EVAP testing when the engine is running, allowing engine vacuum to enter the EVAP system.

Purge Tube Check Valve

Note: The presence of this one-way check valve prevents pressure testing the EVAP system for leaks at the EVAP canister purge tube connector.

Turbocharged vehicles have a check valve in the purge tube between the EVAP purge solenoid valve and the intake manifold to prevent pressurization of the EVAP system under boost conditions. Some applications may have this check valve between the EVAP purge solenoid valve and the EVAP canister.

EVAP Canister

The canister is filled with carbon pellets used to absorb and store fuel vapors. Fuel vapor is stored in the canister until the ECM determines that the vapor can be consumed in the normal combustion process.

Vapor Recirculation Tube

A vapor path between the fuel fill pipe and the vapor tube to the carbon canister is necessary for Vehicle Onboard Diagnostics to fully diagnose the EVAP system. It also accommodates service diagnostic procedures by allowing the entire EVAP system to be diagnosed from either end of the system.

The On-Board Refueling Vapor Recovery System is an on-board vehicle system designed to recover fuel vapors during the vehicle refueling operation. The flow of liquid fuel down the fuel filler pipe provides a liquid seal which prevents vapor from leaving the fuel filler pipe. An EVAP pipe transports the fuel vapor to the EVAP canister for use by the engine.

Fuel Tank Pressure Sensor

The fuel tank pressure sensor measures the difference between the pressure or vacuum in the fuel tank and outside air pressure. Depending on the vehicle, the sensor can be located in the vapor space on top of the fuel tank, in the vapor tube between the canister and the tank, or on the EVAP canister. A high fuel tank pressure sensor voltage indicates a low fuel tank pressure or vacuum. A low fuel tank pressure sensor voltage indicates a high fuel tank pressure.

Fuel Fill Pipe Check Valve

The check valve on the fuel fill pipe is there to prevent spit-back during refueling.

EVAP Vent Solenoid Valve

The EVAP vent solenoid valve controls fresh airflow into the EVAP canister. The valve is normally open. The canister vent solenoid valve is closed only during EVAP system tests performed by the ECM like large leak and engine off natural vacuum test.

Fuel Fill Cap

The fuel fill cap is equipped with a seal and a vacuum relief valve and is tethered. A torque-limiting device prevents the cap from being over tightened. To install the cap, turn the cap clockwise until you hear clicks. This indicates that the cap is correctly torqued and fully seated. A built-in device indicates that the fuel filler cap is fully seated. A fuel filler cap that is not fully seated may cause a malfunction in the emission system.

Capless Fuel Fill

Some vehicles may have a capless fuel fill design behind a locking fuel door. There is no fuel fill cap to remove. One just fully inserts the fuel nozzle into the fill neck, making sure it latches before refueling. Flapper valves close to seal this interface once the fill nozzle is removed.

Fill Limit Vent Valve

This acts as a shut off valve during refueling. This will vary based on fuel tank design. The fuel limit vent valve has the following functions:

- The fuel limit vent valve is located on the inside top of the fuel tank
- This valve is not serviced separately
- Controls the fuel tank fill level by closing the primary vent from the fuel tank and forcing the fuel fill nozzle to shut off.
- Prevents liquid fuel from exiting the fuel tank via the EVAP pipe to the canister.
- Provides fuel-spillage protection in the event of a vehicle rollover by closing the vapor path from the tank to the EVAP canister.

Electronic Ignition System Description

The electronic ignition system produces and controls a high-energy secondary spark. This spark is used to ignite the compressed air/fuel mixture at precisely the correct time. This provides optimal performance, fuel economy, and control of exhaust emissions. This ignition system uses an individual coil for each cylinder. The ignition coils are mounted in the center of each camshaft cover with short integrated boots connecting the coils to the spark plugs. The driver modules within each ignition coil are commanded ON/OFF by the Engine Control Module (ECM). The ECM primarily uses engine speed, the mass air flow (MAF) sensor signal, and position information from the crankshaft position and the camshaft position sensors. This controls the sequence, dwell, and timing of the spark. The electronic ignition system consists of the following components:

Crankshaft Position Sensor

The crankshaft position sensor works in conjunction with a reluctor wheel on the crankshaft (front mounted crankshaft position sensor) or a reluctor wheel that is part of the flywheel (rear mounted crankshaft position sensor). The ECM monitors the voltage frequency on the crankshaft position sensor signal circuit. As each reluctor wheel tooth rotates past the sensor, the sensor creates a digital ON/OFF pulse. This digital signal is processed by the ECM. This creates a signature pattern that enables the ECM to determine the crankshaft position. The ECM uses the signal to determine which pair of cylinders is approaching top dead center based on the crankshaft position signal alone. The camshaft position sensor signals are used in order to determine which of these 2 cylinders is on a firing stroke, and which is on the exhaust stroke. The ECM uses this to properly synchronize the ignition system, the fuel injectors, and the knock control. This sensor is also used in order to detect misfire.

The ECM also has a dedicated replicated crankshaft position sensor signal output circuit that may be used as an input signal to other modules for monitoring engine RPM.

Camshaft Position Sensor

This engine uses a camshaft position sensor for each camshaft. The camshaft position sensor signals are a digital ON/OFF pulse and output 4 times per revolution of the camshaft. The camshaft position sensor does not directly affect the operation of the ignition system. The camshaft position sensor information is used by the ECM to determine the position of the camshaft relative to the crankshaft position. By monitoring the camshaft position and crankshaft position signals the ECM can accurately time the operation of the fuel injectors. The ECM supplies the camshaft position sensor with a 5 V reference circuit and a low reference circuit. The camshaft position sensor signals are an input to the ECM. These signals are also used to detect camshaft alignment with the crankshaft.

The ECM also has a dedicated replicated camshaft position sensor signal output circuit that may be used as an input signal to other modules for monitoring engine RPM.

Knock Sensor

The knock sensor system enables the ECM to control the ignition timing for the best possible performance while protecting the engine from potentially damaging levels of detonation, also known as spark knock. The knock sensor system uses 1 or 2 flat response 2-wire sensors. The sensor uses piezo-electric crystal technology that produces an AC voltage signal of varying amplitude and frequency based on the engine vibration or noise level. The amplitude and frequency depend upon the level of knock that the knock sensor detects. The ECM receives the knock sensor signal through the high and low signal circuits.

The ECM learns a minimum noise level, or background noise, at idle from the knock sensor and uses calibrated values for the rest of the RPM range. The ECM uses the minimum noise level to calculate a noise channel. A normal knock sensor signal will ride within the noise channel. As engine speed and load change, the noise channel upper and lower parameters will change to accommodate the normal knock sensor signal, keeping the signal within the channel. In order to determine which cylinders are knocking, the ECM only uses knock sensor signal information when each cylinder is near top dead center (TDC) of the firing stroke. If knock is present, the signal will range outside of the noise channel.

If the ECM has determined that knock is present, it will retard the ignition timing to attempt to eliminate the knock. The ECM will always try to work back to a zero compensation level, or no spark retard. An abnormal knock sensor signal will stay outside of the noise channel or will not be present. Knock sensor diagnostics are calibrated to detect faults with the knock sensor circuitry inside the ECM, the knock sensor wiring, or the knock sensor voltage output. Some diagnostics are also calibrated to detect constant noise from an outside influence such as a loose/damaged component or excessive engine mechanical noise.

Ignition Coils

Each ignition coil contains a solid state driver module as its primary element. The engine ECM (ECM) signals the coil driver to initiate a firing event by applying ignition control circuit voltage for the appropriate amount of time otherwise known as dwell. When the voltage is removed the coil fires the spark plug.

Engine Control Module (ECM)

The ECM controls all ignition system functions and constantly corrects the spark timing. The ECM monitors information from various sensor inputs that may include the following components, if applicable:

- Throttle position sensor
- Engine coolant temperature (ECT) sensor
- Mass air flow (MAF) sensors
- Intake air temperature (IAT) sensors
- Vehicle speed sensor (VSS)
- Transmission gear position or range information sensors
- Engine knock sensors
- Ambient pressure sensors (BARO)

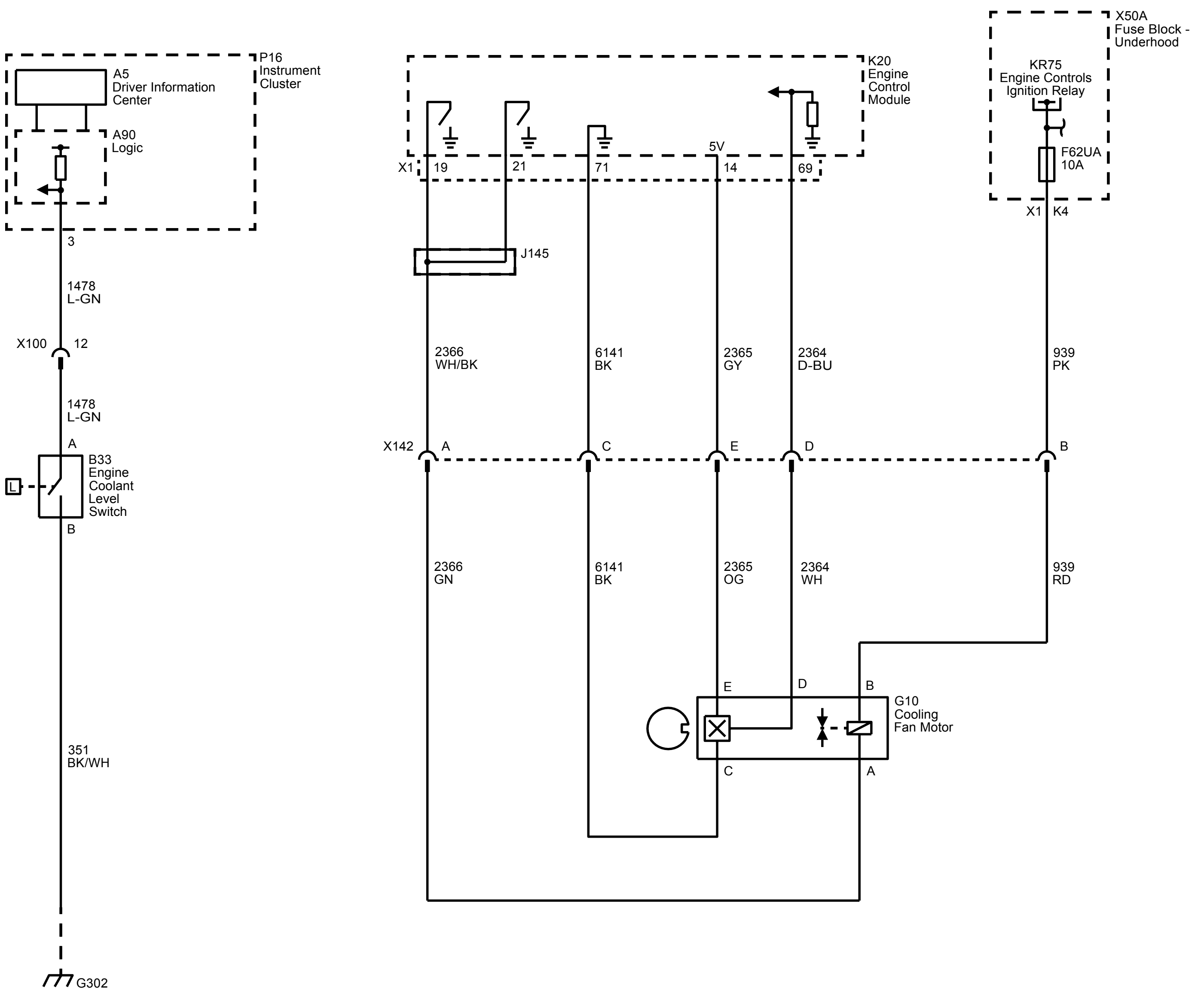
Engine/Propulsion

Engine Heating and Cooling

Schematic and Routing Diagrams

Engine Heating/Cooling Schematics

Engine Cooling (LWN)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A5
Driver Information
Center
A90
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B33
Engine
Coolant
Level
Switch
L
B
351
BK/WH
G302
K20
Engine
Control
Module
X1
19
21
71
5V
14
69
J145
2366
WH/BK
6141
BK
2365
GY
2364
D-BU
X142
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C
E
D
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2366
GN
6141
BK
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OG
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WH
E
D
B
G10
Cooling
Fan Motor
C
A
X50A
Fuse Block -
Underhood
KR75
Engine Controls
Ignition Relay
F62UA
10A
X1
K4
939
PK
939
RD

Description and Operation

Cooling Fan Description and Operation (with Diesel)

Cooling Fan Control

The purpose of the electro-viscous (EV) fan clutch is to maintain powertrain cooling requirements. The engine control module (ECM) monitors the following sensors to regulate the fan speed:

- Engine coolant temperature
- A/C refrigerant pressure
- Vehicle speed
- Intake air temperature
- Transmission fluid temperature
- Ambient air temperature
- Cooling fan speed

The EV cooling fan clutch system enables the engine control module (ECM) to change the speed of the pulley driven cooling fan in relation to the engine speed. Ignition voltage is supplied directly to the fan clutch solenoid valve. The ECM uses two output drivers and a parallel circuit to directly control the EV fan clutch solenoid valve. The ECM controls the solenoid valve by pulse width modulating (PWM) the parallel control circuits to ground, with a solid state device called a driver. The ECM changes the cooling fan speed by increasing or decreasing the solenoid valve ON time, known as duty cycle. As the ECM command increases, so does the ON time of the solenoid. When the solenoid in the fan clutch is energized, it opens the spring loaded valve and allows fluid to flow from the storage chamber to the fluid coupling of the cooling fan clutch, increasing the fan speed. When the solenoid is de-energized, the spring loaded valve closes, and allows the fluid in the coupling of the fan clutch to drain back to the storage chamber, reducing fan speed. The rapid modulation of the fan clutch solenoid valve gives the ECM the ability to precisely control the amount of fluid that remains in the fluid coupler, allowing more effective regulation of the fan speed and powertrain cooling requirements.

The fan clutch supplies a feedback signal to the ECM, as an actual fan speed input. The fan speed sensor is a hall effect sensor which is internal to the fan clutch. The ECM supplies a 5-volt reference and a low reference to the hall effect sensor. The hall effect sensor returns a signal pulse through the cooling fan speed signal circuit in response to the reluctor track passing by the magnetic field of the hall effect sensor.

The scan tool can operate the cooling fan clutch. This is done through the controls function menu screen. Cooling fan clutch engagement can take up to 2 minutes with a 100 percent command and the engine speed at 2,000 RPM. The lower the engine speed, the longer it will take for the fan to engage. Cooling fan disengagement can take up to 2 minutes with the engine speed at 2,000 RPM. The lower the engine speed, the longer it will take to disengage. In lower ambient air temperatures the cooling fan will engage in less time, however, it will take longer to disengage due to the properties of the fluid vs. temperature.

Under certain conditions the cooling fan may be engaged at engine start. The cooling may have been engaged at the time the engine was turned off. Or, fluid may bleed from the storage chamber into the fluid coupling of the cooling fan clutch while the engine is off. Although the fan clutch is commanded off during a cold start, this is the most likely time a vehicle driver will notice that the fan noise is excessive in comparison to engine starts when the fan clutch is disengaged.

Cooling System Electronic Component Description and Operation

Coolant Heater

The coolant heater operates using 110 V AC external power and is designed to warm the coolant in the engine block area for improved starting in very cold weather. The coolant heater also helps reduce fuel consumption when a cold engine is warming up. The unit is equipped with a detachable AC power cord. A weather shield on the cord is provided to protect the plug when not in use.

Engine or Radiator Coolant Temperature Sensor

The engine coolant temperature (ECT) sensor or radiator coolant temperature (RCT) sensor is a variable resistor that measures the temperature of the engine or radiator coolant. The ECM supplies 5 V to the sensor signal circuit and a ground for the low reference circuit.

Engine Coolant Thermostat Heater

The ECM controls the pulse width modulated (PWM) thermostat heater circuit. The engine coolant thermostat heater helps control coolant flow and regulates the engine operating temperature. The ignition relay supplies 12 V to the thermostat through a fuse. The ECM controls the engine coolant thermostat heater by grounding the control circuit with a solid state device called a driver. The driver is equipped with a feedback circuit that is pulled-up to a voltage. The ECM can determine if the control circuit is open, shorted to ground, or shorted to a voltage by monitoring the feedback voltage.

Electronic Coolant Pump

The switchable water pump is always ON in the default position. When commanded, an actuator disengages a clutch that decouples the pump from the engine. An Engine Material Sensor has been introduced on the engine head for the switchable water pump control and engine protection purposes. The engine metal temperature (EMT) sensor is present only if the switchable water pump is present in the specific application.

Engine Metal Temperature Sensor/Cylinder Head Temperature Sensor

The cylinder head temperature sensor is a variable resistor that measures the temperature of the cylinder head. The engine control module (ECM) supplies 5 V to the cylinder head temperature sensor signal circuit and a ground for the low reference circuit.

Electro-Viscous (EV) Fan Clutch

The ECM controls the EV fan clutch operation. The ECM regulates a 12-volt pulse width modulated signal (PWM) to the cooling fan relay. The PWM signal determines the ON time of the relay. As the ECM command increases, so does the ON time of the relay. The relay ON time directly controls the amount of time the solenoid, which is internal to the fan clutch, is energized. When the solenoid in the fan clutch is energized, it opens the spring loaded valve and allows fluid to flow from the storage chamber to the fluid coupling of the cooling fan clutch, which increases the fan speed. When the solenoid is de-energized, the spring loaded valve closes, and allows the fluid in the coupling of the fan clutch to drain back to the storage chamber, which reduces fan speed. The rapid modulation of the fan clutch solenoid valve gives the ECM the ability to precisely control the amount of fluid that remains in the fluid coupler, allowing more effective regulation of the fan speed and powertrain cooling requirements.

Cooling System Description and Operation

Coolant Heater

The optional engine coolant heater (RPO KO5) is designed to warm the coolant in the engine block area for improved starting in very cold weather (temperatures below −29°C (−20°F). The coolant heater helps reduce fuel consumption when a cold engine is warming up. The engine coolant heater operates using AC external power and a heating element installed in the water jacket of the engine block. The heating element warms the coolant when the heater cord is plugged into an AC power source.

The unit is equipped with a detachable AC power cord. A weather shield on the cord is provided to protect the plug when not in use.

Cooling System

The cooling systems function is to maintain an efficient engine operating temperature during all engine speeds and operating conditions. The cooling system is designed to remove approximately one-third of the heat produced by the burning of the air-fuel mixture. When the engine is cold, the coolant does not flow to the radiator until the thermostat opens. This allows the engine to warm quickly.

Coolant Level Control

The engine cooling system contains an engine coolant level switch which alerts the driver in the event of a coolant loss. When the engine coolant level switch reads a low coolant level in the surge tank, the switch opens. This sends a coolant loss signal to the instrument panel cluster (IPC) by the coolant level switch signal circuit. Ground is provided for the coolant level control.

Cooling Cycle

Coolant flows from the radiator outlet and into the water pump inlet. Some coolant flows from the water pump, to the heater core, then back to the water pump. This provides the passenger compartment with heat and defrost capability as the coolant warms up.

Coolant also flows from the water pump outlet and into the engine block. In the engine block, the coolant circulates through the water jackets surrounding the cylinders where it absorbs heat.

The coolant then flows through the cylinder head gasket openings and into the cylinder heads. In the cylinder heads, the coolant flows through the water jackets surrounding the combustion chambers and valve seats, where it absorbs additional heat.

Some engine applications, coolant is also directed to the throttle body. There it circulates through passages in the casting. The coolant assists in regulating the throttle body temperature.

From the cylinder heads, the coolant flows to the thermostat. The flow of coolant will either be stopped at the thermostat until the engine reaches operating temperature or it will flow through the thermostat and into the radiator where it is cooled. At this point, the coolant flow cycle is completed.

Efficient operation of the cooling system requires proper functioning of all cooling system components. The cooling system consists of the following components:

Coolant

The engine coolant is a solution made up of a 50-50 mixture of DEX-COOL and suitable drinking water. The coolant solution carries excess heat away from the engine to the radiator, where the heat is dissipated to the atmosphere.

Radiator

The radiator is a heat exchanger. It consists of a core and 2 tanks. The aluminum core is a tube and fin cross-flow design that extends from the inlet tank to the outlet tank. Fins are placed around the outside of the tubes to improve heat transfer to the atmosphere. The inlet and outlet tanks are a molded high temperature, nylon reinforced plastic material. A high temperature rubber gasket seals the tank flange edge to the aluminum core. The tanks are clamped to the core with clinch tabs. The tabs are part of the aluminum header at each end of the core. The radiator also has a drain cock located in the bottom of the left hand tank. The drain cock unit includes the drain cock and drain cock seal.

The radiator removes heat from the coolant passing through it. The fins on the core transfer heat from the coolant passing through the tubes. As air passes between the fins, it absorbs heat and cools the coolant.

During vehicle use, the coolant is heated and expands. The increased coolant volume flows into the surge tank. As the coolant circulates, any air is allowed to bubble out. Coolant without air bubbles absorbs heat much better than coolant with bubbles.

Coolant Recovery System

The coolant recovery system consists of a plastic coolant recovery reservoir, an overflow tube, and a pressure cap on the radiator. The recovery reservoir is also called a recovery tank or expansion tank. It is partially filled with coolant and is connected to the radiator fill neck with the overflow tube. Coolant can flow back and forth between the radiator and the reservoir.

In effect, a cooling system with a coolant recovery reservoir is a closed system. When the pressure in the cooling system gets too high, it will open the pressure valve in the pressure cap. This allows the coolant, which has expanded due to being heated, to flow through the overflow tube and into the recovery reservoir. As the engine cools down, the temperature of the coolant drops and a vacuum is created in the cooling system. This vacuum opens the vacuum valve in the pressure cap, allowing some of the coolant in the reservoir to be siphoned back into the radiator. Under normal operating conditions, no coolant is lost. Although the coolant level in the recovery reservoir goes up and down, the radiator and cooling system are kept full. An advantage to using a coolant recovery reservoir is that it eliminates almost all air bubbles from the cooling system. Coolant without air bubbles absorbs heat much better than coolant with bubbles.

Pressure Cap

The pressure cap seals the cooling system. It contains a blow off or pressure relief valve and a vacuum or atmospheric valve. The pressure valve is held against its seat by a spring, which protects the radiator from excessive cooling system pressure. The vacuum valve is held against its seat by a spring, which permits opening of the valve to relieve vacuum created in the cooling system as it cools off. The vacuum, if not relieved, might cause the radiator and/or coolant hoses to collapse.

The pressure cap allows cooling system pressure to build up as the temperature increases. As the pressure builds, the boiling point of the coolant increases. Engine coolant can be safely run at a temperature much higher than the boiling point of the coolant at atmospheric pressure. The hotter the coolant is, the faster the heat transfers from the radiator to the cooler, passing air.

The pressure in the cooling system can get too high. When the cooling system pressure exceeds the rating of the pressure cap, it raises the pressure valve, venting the excess pressure.

As the engine cools down, the temperature of the coolant drops and a vacuum is created in the cooling system. This vacuum causes the vacuum valve to open, allowing outside air into the surge tank. This equalizes the pressure in the cooling system with atmospheric pressure, preventing the radiator and coolant hoses from collapsing.

Cooling Fan and Clutch

The engine cooling fan and clutch are driven by the crankshaft via the drive belt. The cooling fan draws air through the radiator to improve the transfer of heat from the coolant to the atmosphere. As the fan blades spin, they pull cool, outside air past the radiator core. The fan clutch drives the cooling fan. The fan clutch controls the amount of torque that is transmitted from the crankshaft to the fan blades. The clutch allows more torque to engage on the fan when the engine operating temperature increases and/or the vehicle speed is low. As the torque increases, the fan turns more quickly. The fan clutch decreases the torque applied to the cooling fan when the engine temperature decreases and/or the vehicle speed is high. As the torque decreases, the fan speed decreases.

Air Baffles and Seals

The cooling system uses deflectors, air baffles and air seals to increase cooling system capability. Deflectors are installed under the vehicle to redirect airflow beneath the vehicle and through the radiator to increase engine cooling. Air baffles are also used to direct airflow through the radiator and increase cooling capability. Air seals prevent air from bypassing the radiator and A/C condenser, and prevent recirculation of hot air for better hot weather cooling and A/C condenser performance.

Water Pump

The water pump is a centrifugal vane impeller type pump. The pump consists of a housing with coolant inlet and outlet passages, a retaining plate, pulley and an impeller. The impeller is mounted on the pump shaft, and consists of a series of flat or curved blades or vanes on a flat plate. When the impeller rotates, the coolant between the vanes is thrown outward by centrifugal force. The impeller shaft is supported by one or more sealed bearings. The sealed bearings never need to be lubricated. Grease cannot leak out, dirt and water cannot get in as long as the seal is not damaged or worn.

The purpose of the water pump is to circulate coolant throughout the cooling system. The water pump is driven by the crankshaft via the drive belt.

Thermostat

The thermostat is a coolant flow control component. It's purpose is to help regulate the operating temperature of the engine. It utilizes a temperature sensitive wax-pellet element. The element connects to a valve through a small piston. When the element is heated, it expands and exerts pressure against a small piston. This pressure forces the valve to open. As the element is cooled, it contracts. This contraction allows a spring to push the valve closed.

When the coolant temperature is below 85°C (185°F) for diesel engines and below 91°C (195°F) for gas engines, the thermostat valve remains closed. This prevents circulation of the coolant from the radiator and allows the engine to warm up. After the coolant temperature reaches 85°C (185°F) or 91°C (195°F), the thermostat valve will open. The coolant is then allowed to circulate through the thermostat to the engine and then to the radiator where the engine heat is dissipated to the atmosphere. The thermostat also provides a restriction in the cooling system, after it has opened. This restriction creates a pressure difference which prevents cavitation at the water pump and forces coolant to circulate through the engine block.

Engine Oil Cooler

The engine oil cooler is a heat exchanger. It is located inside the left side end tank of the radiator. The engine oil temperature is controlled by the temperature of the engine coolant that surrounds the oil cooler in the radiator.

The engine oil pump pumps the oil through the engine oil cooler line to the oil cooler. The oil then flows through the cooler where the engine coolant absorbs heat from the oil. The oil is then pumped through the oil cooler return line, to the oil filter, to the engine block oil system.

Transmission Oil Cooler

The transmission oil cooler is a heat exchanger. It is located inside the right side end tank of the radiator. The transmission fluid temperature is regulated by the temperature of the engine coolant in the radiator.

The transmission oil pump, pumps the fluid through the transmission oil cooler line to the transmission oil cooler. The fluid then flows through the cooler where the engine coolant absorbs heat from the fluid. The fluid is then pumped through the transmission oil cooler return line, to the transmission.

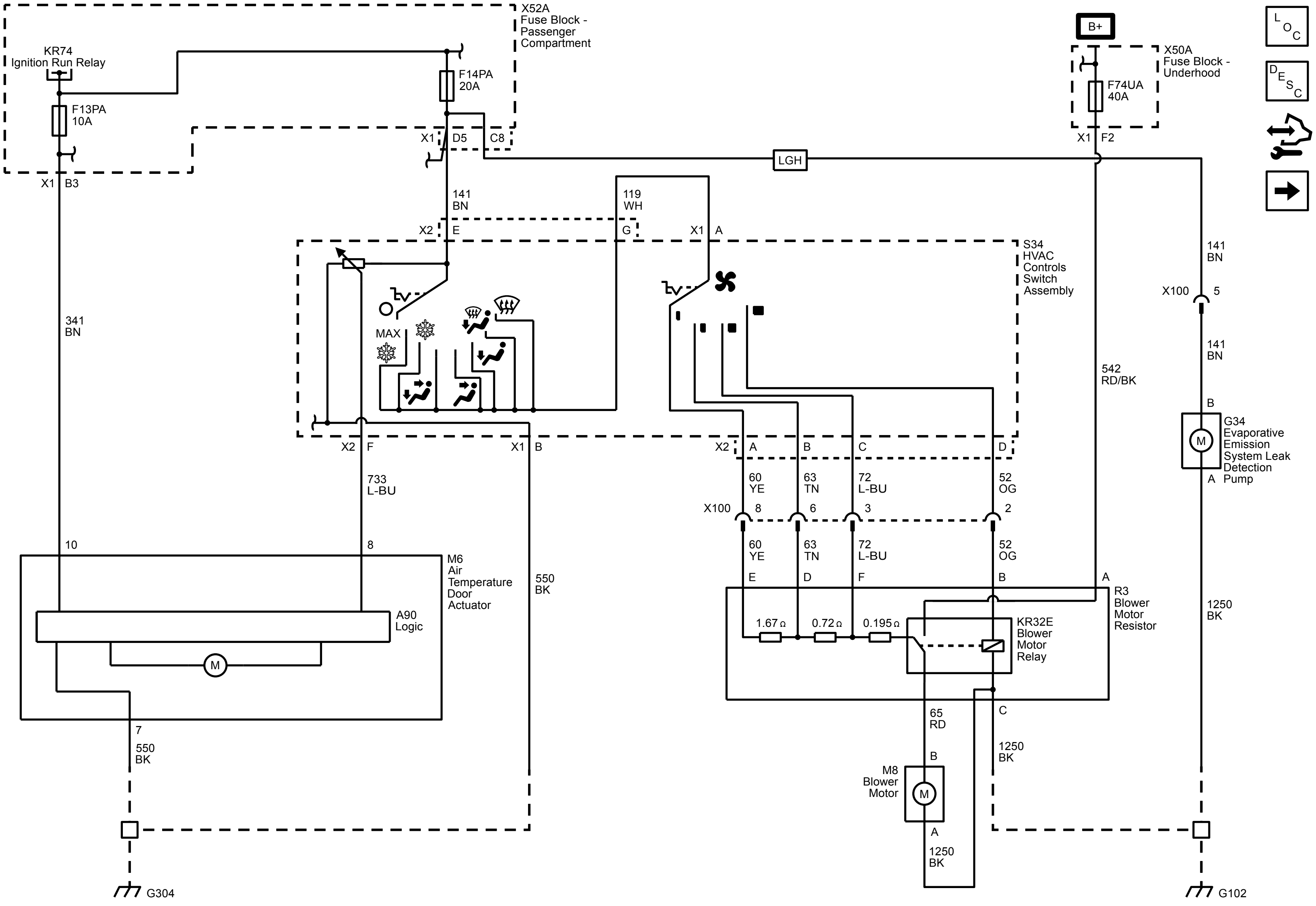
HVAC

HVAC - Manual

Schematic and Routing Diagrams

HVAC Schematics

Front Air Delivery Controls, Front Blower Motor, and EVAP Leak Detection Pump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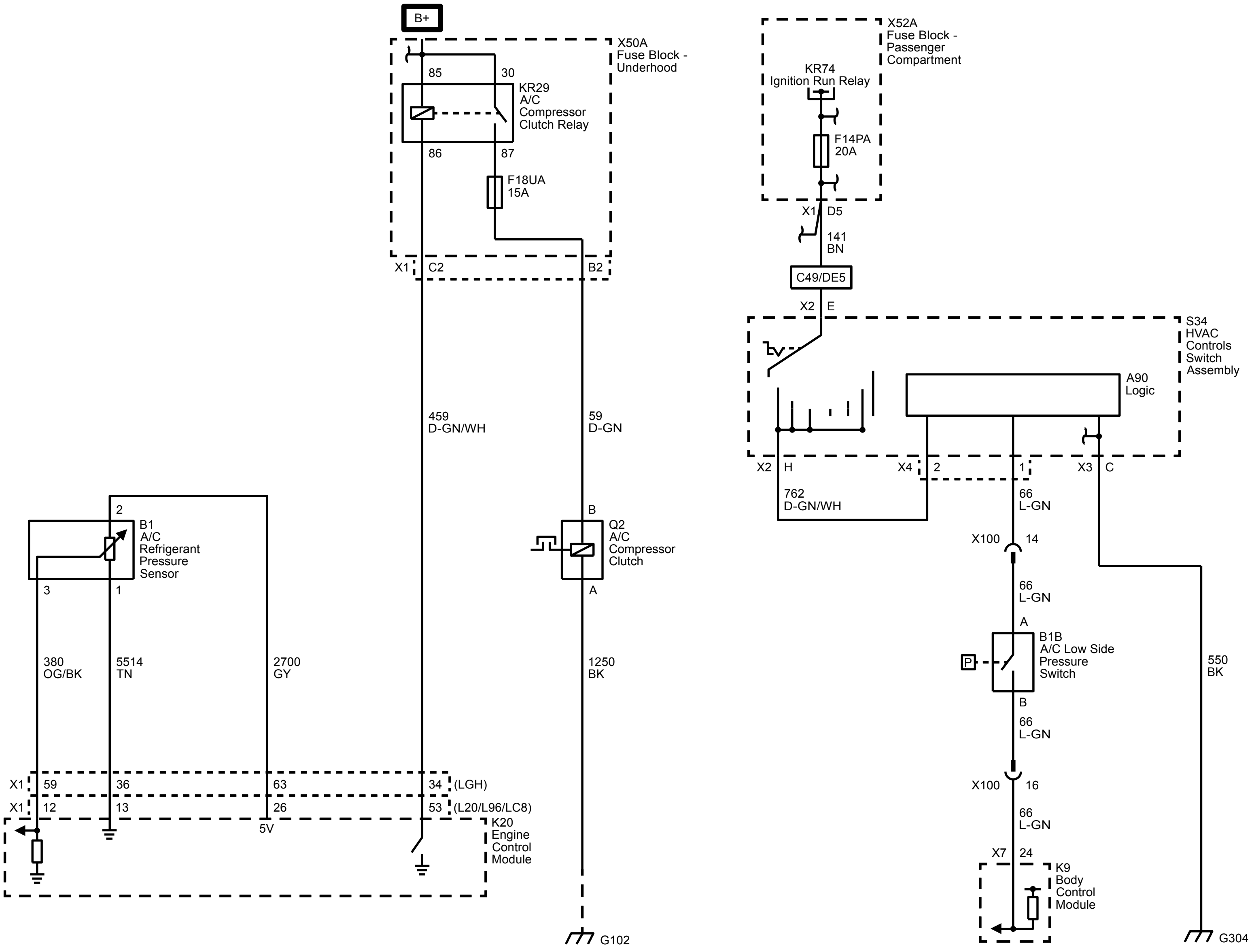
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A/C
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Clutch Relay
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B2
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D-GN/WH
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Compressor
Clutch
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BK
G102
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B1
A/C
Refrigerant
Pressure
Sensor
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X1
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13
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5V
K20
Engine
Control
Module
X52A
Fuse Block -
Passenger
Compartment
KR74
Ignition Run Relay
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20A
X1
D5
141
BN
C49/DE5
X2
E
S34
HVAC
Controls
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X2
H
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X3
C
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D-GN/WH
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X100
14
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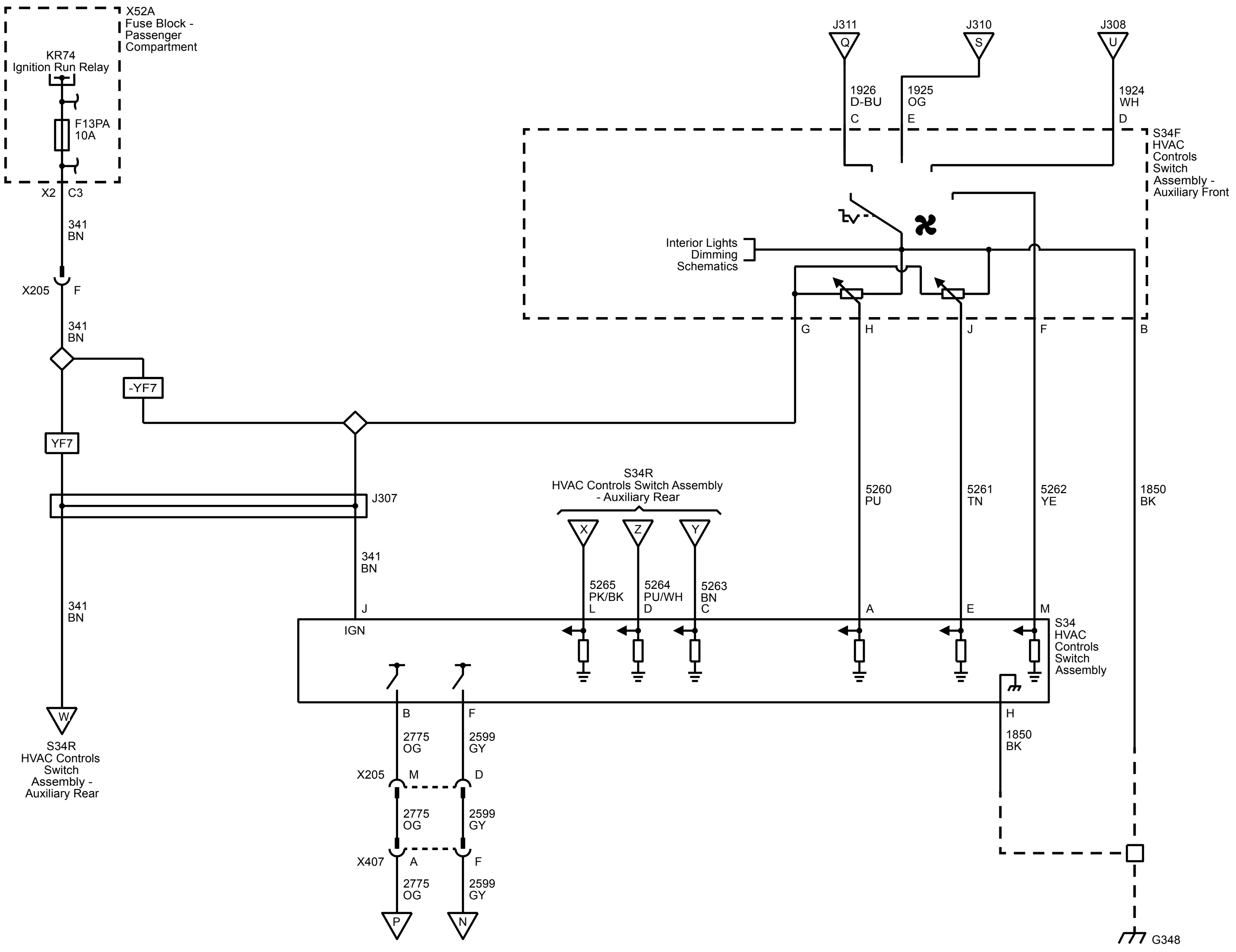
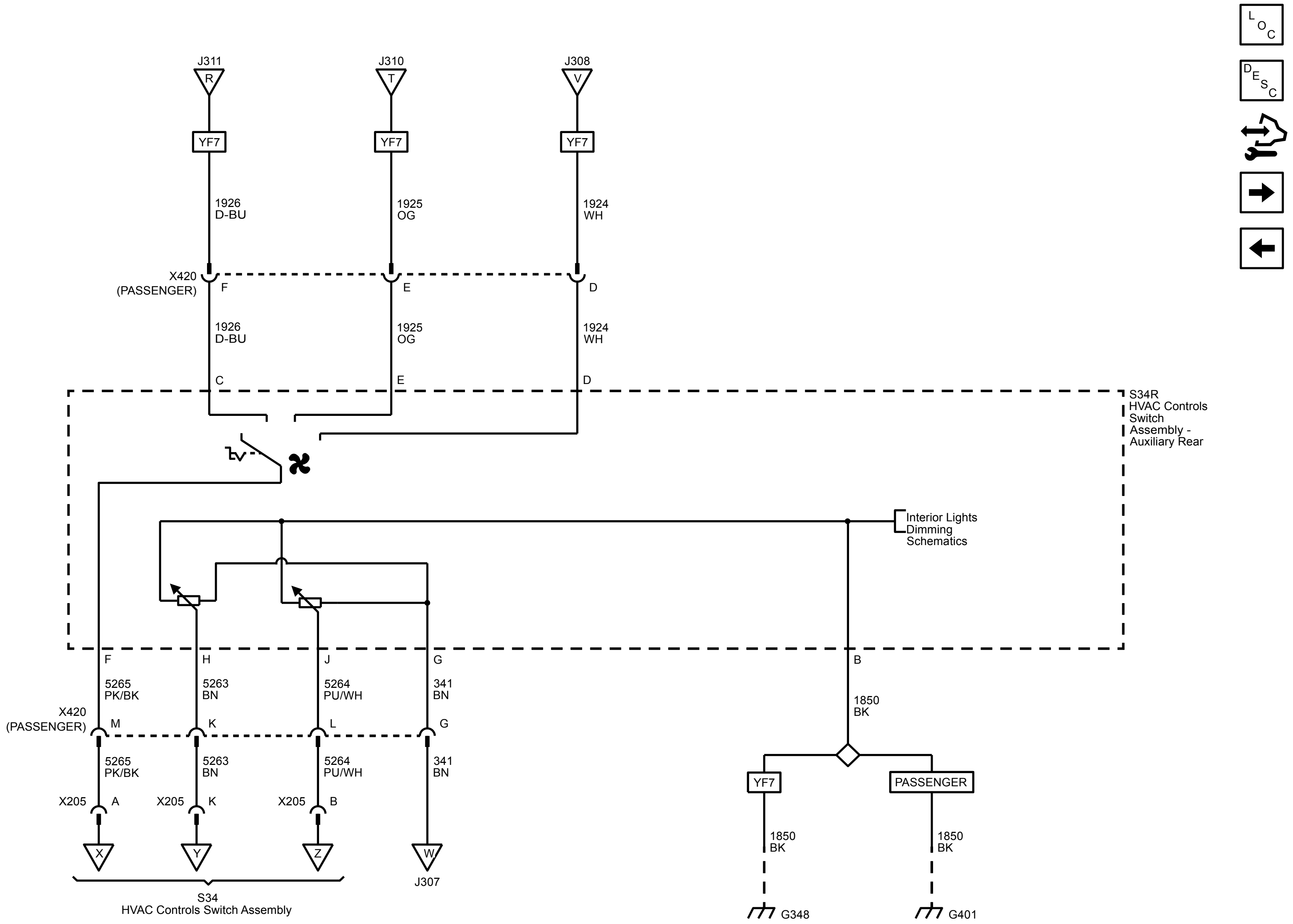
L-GN
A
P
B1B
A/C Low Side
Pressure
Switch
B
66
L-GN
X100
16
66
L-GN
X7
24
K9
Body
Control
Module
550
BK
G304

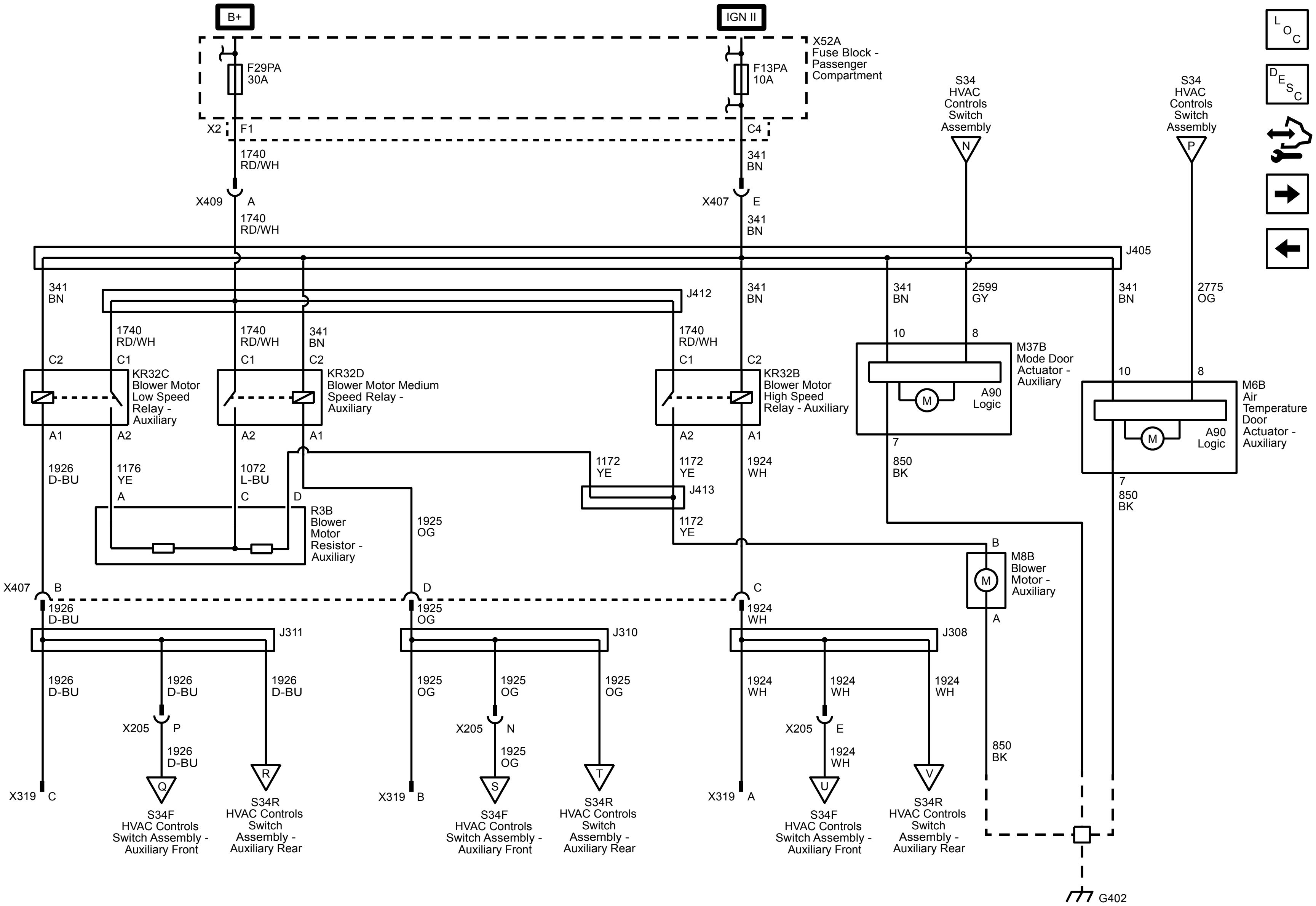
Rear HVAC without Rear Air Conditioning (C36 Without C69)


X52A
Fuse Block - Passenger Compartment
KR74
Ignition Run Relay
F13PA
10A
X2
C3
341
BN
X205
F
341
BN
-YF7
YF7
J307
341
BN
341
BN
W
S34R
HVAC Controls Switch Assembly - Auxiliary Rear
J311
Q
J310
S
J308
U
1926
D-BU
C
1925
OG
E
1924
WH
D
S34F
HVAC Controls Switch Assembly - Auxiliary Front
Interior Lights Dimming Schematics
G
H
J
F
B
S34R
HVAC Controls Switch Assembly - Auxiliary Rear
X
Z
Y
5265
PK/BK
L
5264
PU/WH
D
5263
BN
C
5260
PU
A
5261
TN
E
5262
YE
M
1850
BK
J
IGN
S34
HVAC Controls Switch Assembly
B
2775
OG
F
2599
GY
X205
M
D
2775
OG
2599
GY
X407
A
F
2775
OG
2599
GY
P
N
H
1850
BK
G348

Rear HVAC with Rear Air Conditioning (C69), without Rear HVAC Controls - Air Delievery Controls


J311
R
J310
T
J308
V
YF7
YF7
YF7
1926
D-BU
1925
OG
1924
WH
X420
(PASSENGER)
F
E
D
1926
D-BU
1925
OG
1924
WH
C
E
D
S34R
HVAC Controls
Switch
Assembly -
Auxiliary Rear
Interior Lights
Dimming
Schematics
F
H
J
G
B
5265
PK/BK
5263
BN
5264
PU/WH
341
BN
1850
BK
X420
(PASSENGER)
M
K
L
G
YF7
PASSENGER
5265
PK/BK
5263
BN
5264
PU/WH
341
BN
X205
A
X205
K
X205
B
X
Y
Z
W
J307
1850
BK
1850
BK
G348
G401
S34
HVAC Controls Switch Assembly

Rear HVAC with Rear Air Conditioning (C69), without Rear HVAC Controls - Front Controls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IGN II
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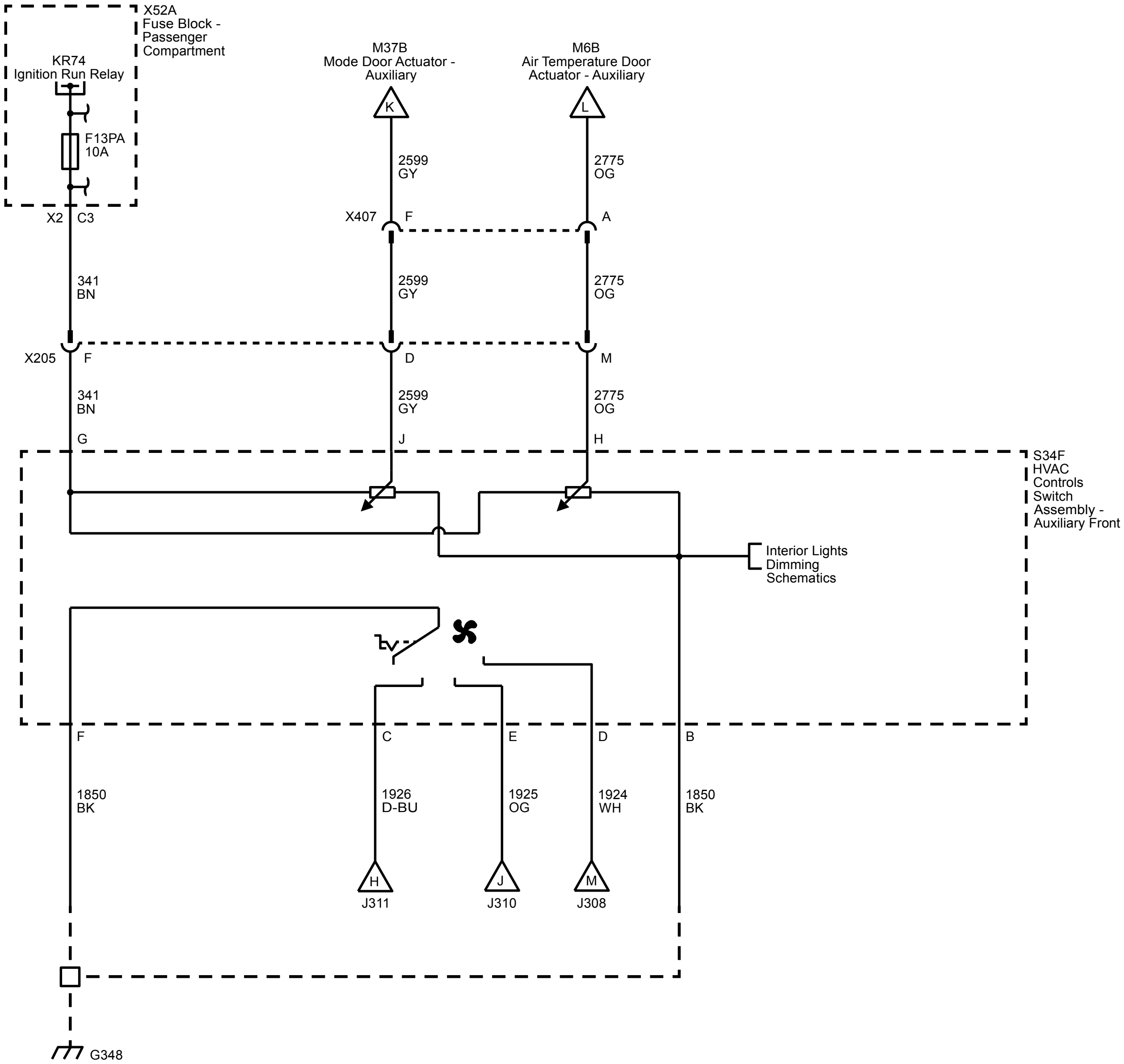
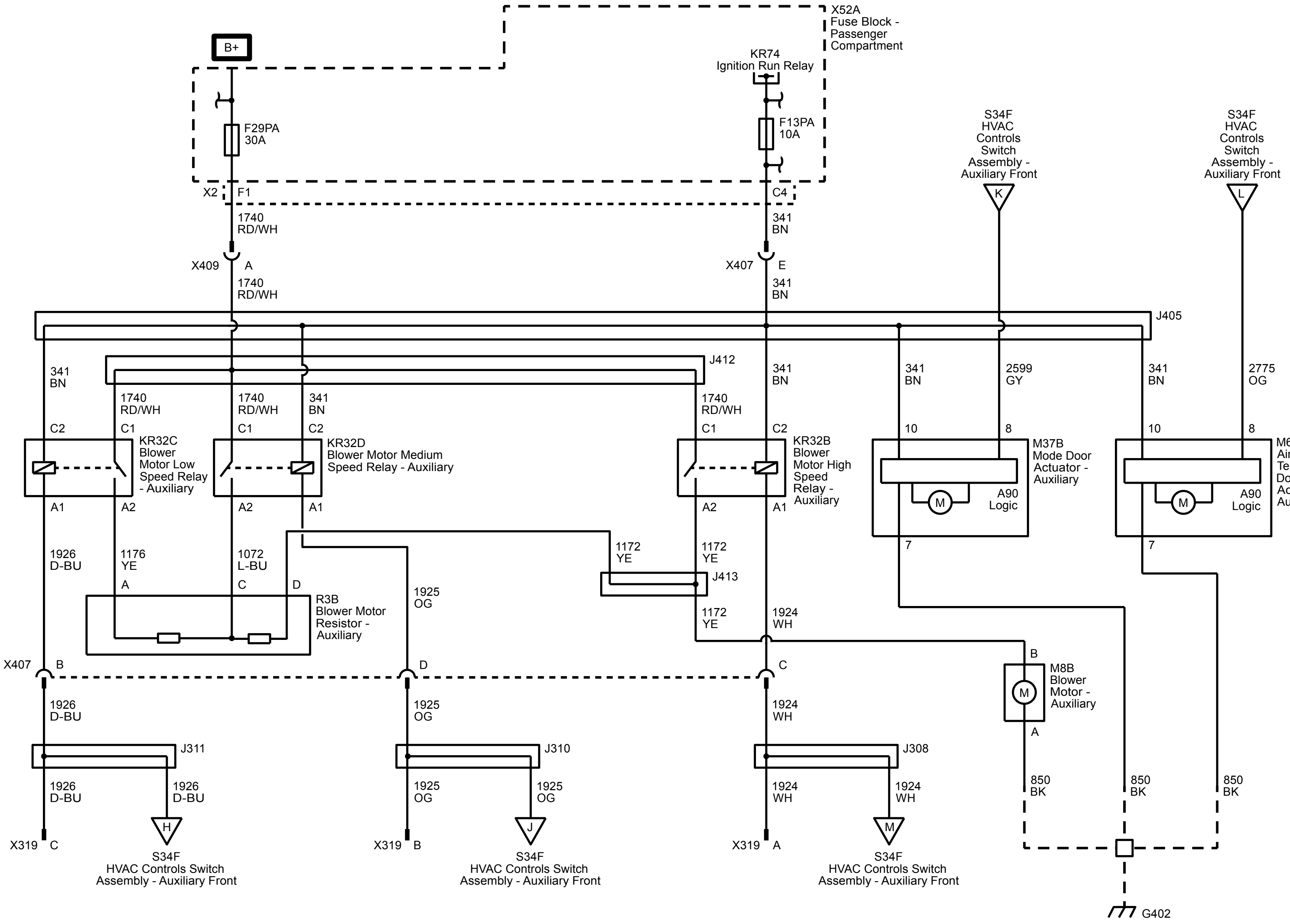
Fuse Block - Passenger Compartment
F29PA
30A
F13PA
10A
X2
F1
C4
1740
RD/WH
341
BN
X409
A
X407
E
1740
RD/WH
341
BN
J405
J412
S34
HVAC Controls Switch Assembly
N
S34
HVAC Controls Switch Assembly
P
341
BN
1740
RD/WH
1740
RD/WH
341
BN
1740
RD/WH
341
BN
341
BN
2599
GY
341
BN
2775
OG
C2
C1
KR32C
Blower Motor Low Speed Relay - Auxiliary
C1
C2
KR32D
Blower Motor Medium Speed Relay - Auxiliary
C1
C2
KR32B
Blower Motor High Speed Relay - Auxiliary
10
8
M37B
Mode Door Actuator - Auxiliary
M
A90
Logic
10
8
M6B
Air Temperature Door Actuator - Auxiliary
M
A90
Logic
A1
A2
A2
A1
A2
A1
7
850
BK
7
850
BK
1926
D-BU
1176
YE
1072
L-BU
1172
YE
1172
YE
1924
WH
J413
A
C
D
R3B
Blower Motor Resistor - Auxiliary
1925
OG
1172
YE
B
M
M8B
Blower Motor - Auxiliary
A
X407
B
D
C
1926
D-BU
1925
OG
1924
WH
J311
J310
J308
1926
D-BU
1926
D-BU
1926
D-BU
1925
OG
1925
OG
1925
OG
1924
WH
1924
WH
1924
WH
X205
P
X205
N
X205
E
1926
D-BU
1925
OG
1924
WH
850
BK
X319
C
Q
S34F
HVAC Controls Switch Assembly - Auxiliary Front
R
S34R
HVAC Controls Switch Assembly - Auxiliary Rear
X319
B
S
S34F
HVAC Controls Switch Assembly - Auxiliary Front
T
S34R
HVAC Controls Switch Assembly - Auxiliary Rear
X319
A
U
S34F
HVAC Controls Switch Assembly - Auxiliary Front
V
S34R
HVAC Controls Switch Assembly - Auxiliary Rear
G402
L O C
D E S C

Rear HVAC with Rear Air Conditioning (C69), with Rear HVAC Controls - Air Delievery Controls

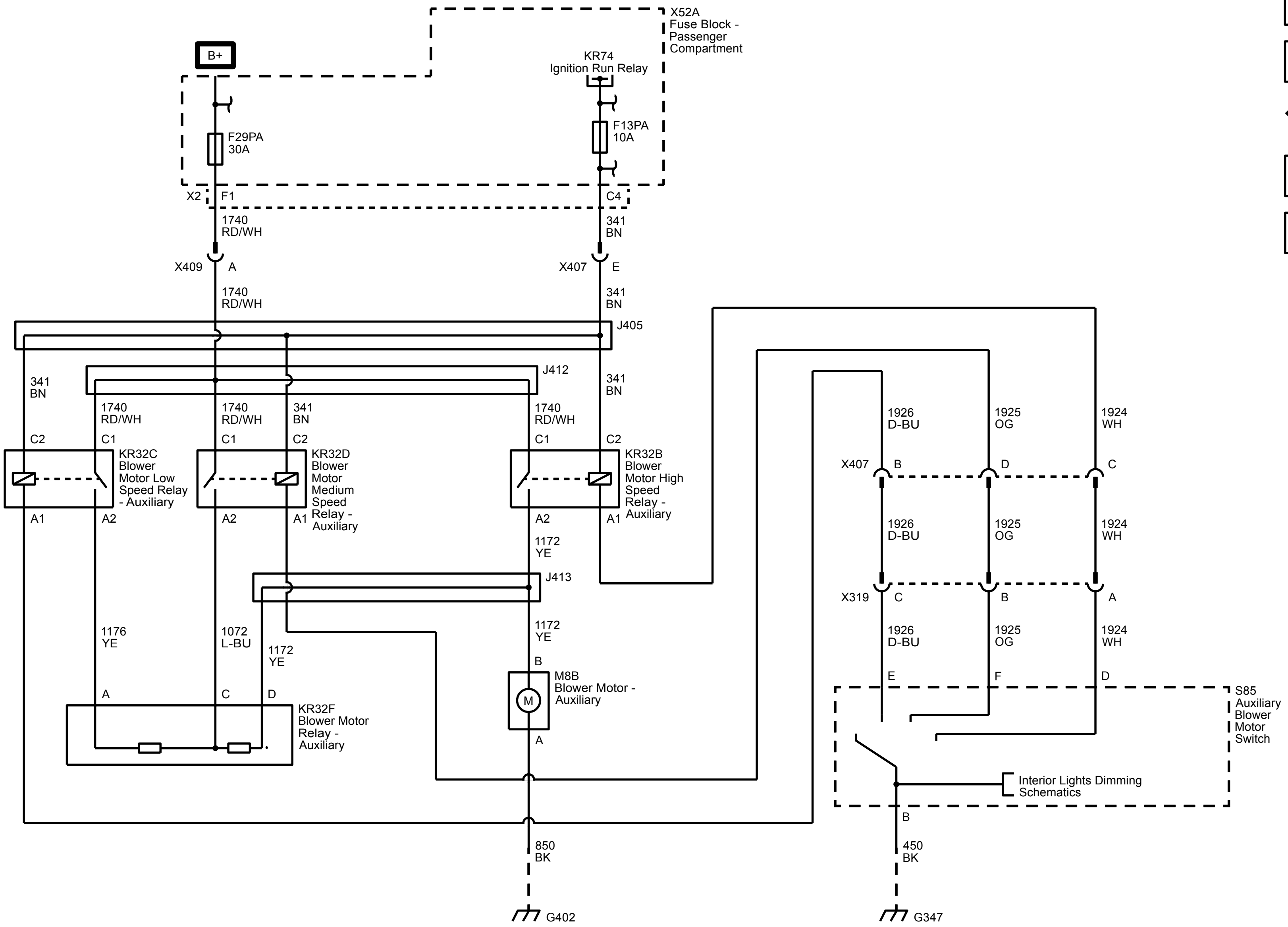
LOC
DESC


X52A
Fuse Block - Passenger Compartment
KR74
Ignition Run Relay
F13PA
10A
X2
C3
341
BN
M37B
Mode Door Actuator - Auxiliary
K
2599
GY
M6B
Air Temperature Door Actuator - Auxiliary
L
2775
OG
X407
F
A
2599
GY
2775
OG
X205
F
D
M
341
BN
2599
GY
2775
OG
G
J
H
S34F
HVAC Controls Switch Assembly - Auxiliary Front
Interior Lights Dimming Schematics
F
C
E
D
B
1850
BK
1926
D-BU
1925
OG
1924
WH
1850
BK
H
J311
J
J310
M
J308
G348

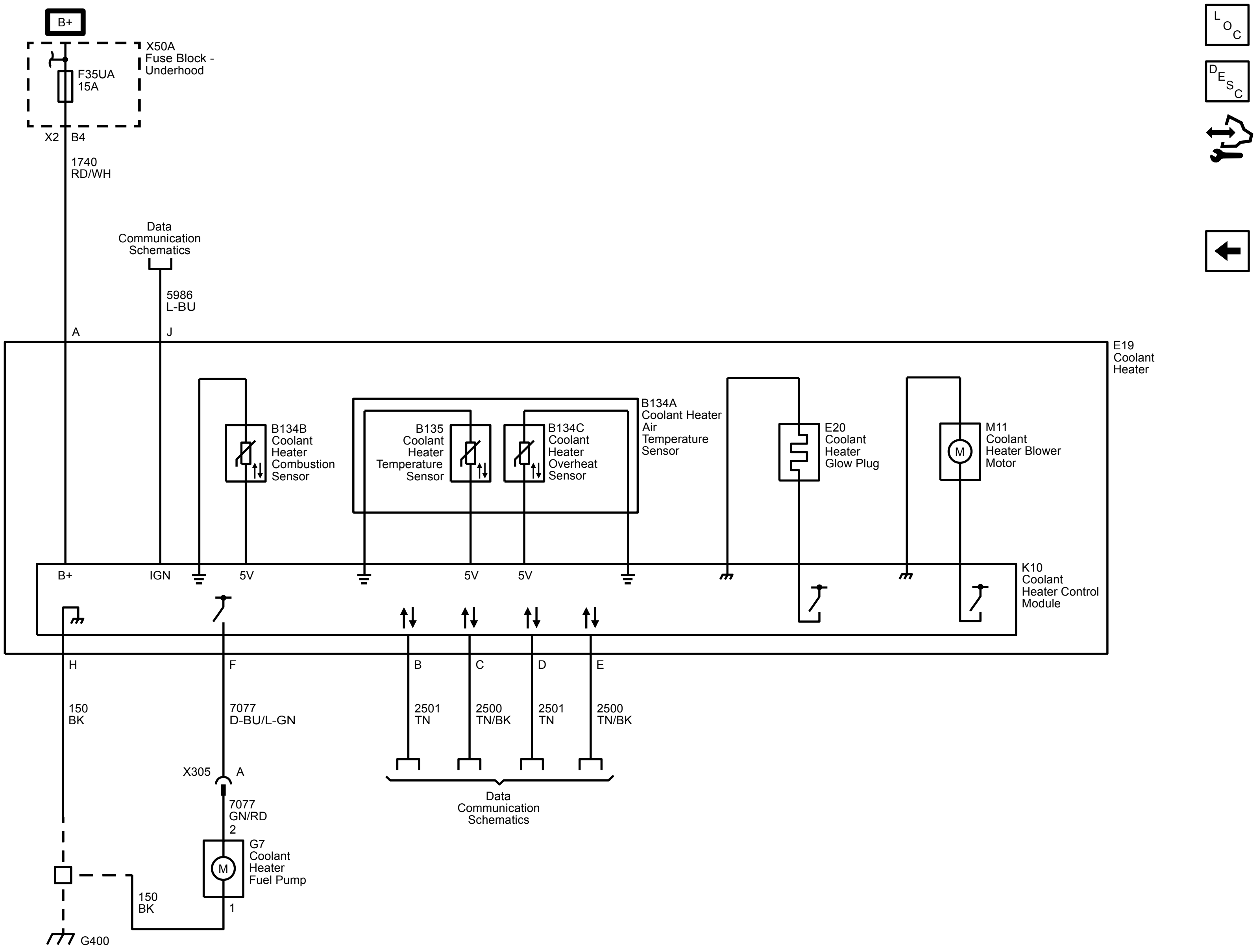
Rear HVAC with Rear Air Conditioning (C69), with Rear HVAC Controls - Front Controls


B+
X52A
Fuse Block - Passenger Compartment
KR74
Ignition Run Relay
F29PA
30A
F13PA
10A
X2
F1
C4
1740
RD/WH
341
BN
X409
A
X407
E
S34F
HVAC Controls Switch Assembly - Auxiliary Front
K
L
J405
J412
2599
GY
2775
OG
C2
C1
KR32C
Blower Motor Low Speed Relay - Auxiliary
A1
A2
KR32D
Blower Motor Medium Speed Relay - Auxiliary
KR32B
Blower Motor High Speed Relay - Auxiliary
10
8
M37B
Mode Door Actuator - Auxiliary
M6B
Air Temperature Door Actuator - Auxiliary
M
A90
Logic
7
1926
D-BU
1176
YE
1072
L-BU
1172
YE
J413
R3B
Blower Motor Resistor - Auxiliary
C
D
1925
OG
1924
WH
B
M8B
Blower Motor - Auxiliary
X407
J311
J310
J308
X319
H
J
850
BK
G402

Rear HVAC with Rear Air Conditioning (C69), with Rear HVAC Controls - Rear Controls


B+
X52A
Fuse Block - Passenger Compartment
KR74
Ignition Run Relay
F29PA
30A
F13PA
10A
X2
F1
C4
1740
RD/WH
341
BN
X409
A
X407
E
1740
RD/WH
341
BN
J405
J412
341
BN
1740
RD/WH
1740
RD/WH
341
BN
1740
RD/WH
341
BN
C2
C1
KR32C
Blower Motor Low Speed Relay - Auxiliary
C1
C2
KR32D
Blower Motor Medium Speed Relay - Auxiliary
C1
C2
KR32B
Blower Motor High Speed Relay - Auxiliary
A1
A2
A2
A1
A2
A1
1172
YE
J413
1176
YE
1072
L-BU
1172
YE
1172
YE
A
C
D
KR32F
Blower Motor Relay - Auxiliary
B
M
M8B
Blower Motor - Auxiliary
A
1926
D-BU
1925
OG
1924
WH
X407
B
D
C
1926
D-BU
1925
OG
1924
WH
X319
C
B
A
1926
D-BU
1925
OG
1924
WH
E
F
D
S85
Auxiliary Blower Motor Switch
Interior Lights Dimming Schematics
B
850
BK
450
BK
G402
G347

Coolant Heater (K08)


B+
X50A
Fuse Block - Underhood
F35UA
15A
X2
B4
1740
RD/WH
Data Communication Schematics
5986
L-BU
A
J
E19
Coolant Heater
B134B
Coolant Heater Combustion Sensor
B135
Coolant Heater Temperature Sensor
B134C
Coolant Heater Overheat Sensor
B134A
Coolant Heater Air Temperature Sensor
E20
Coolant Heater Glow Plug
M11
Coolant Heater Blower Motor
M
B+
IGN
5V
5V
5V
K10
Coolant Heater Control Module
H
F
B
C
D
E
150
BK
7077
D-BU/L-GN
2501
TN
2500
TN/BK
2501
TN
2500
TN/BK
X305
A
7077
GN/RD
2
G7
Coolant Heater Fuel Pump
M
1
150
BK
Data Communication Schematics
G400
LOC
DESC

Description and Operation

Air Delivery Description and Operation

The air delivery description and operation is divided into 6 areas:

- HVAC Control Components
- Air Speed
- Auxiliary Air Speed
- Air Distribution
- Auxiliary Air Delivery
- Recirculation Operation

HVAC Control Components

HVAC Control Assembly

The HVAC control assembly is a non-class 2 device that interfaces between the operator and the HVAC system to maintain air temperature and distribution settings. The ignition 3 voltage circuit provides power to the control assembly. Two integrated potentiometers control air temperature door position and blower motor speed. The integrated vacuum system controls the mode door position. The control assembly supports the following features:

Feature	Availability
Afterblow	No
Purge	No
Personalization	No
Actuator Calibration	No

Auxiliary HVAC Control Processor

The auxiliary HVAC control processor controls all outputs for the auxiliary HVAC system. The auxiliary HVAC control processor receives inputs from the front and rear auxiliary HVAC control assemblies. The auxiliary HVAC control processor does not utilize Class 2 communications. If the auxiliary HVAC control processor receives a 12 volt varied voltage input for an auxiliary air temperature actuator change request. Then the auxiliary HVAC control processor creates a 12 volt varied output for control of the auxiliary air temperature actuator.

Auxiliary Mode Actuator

The auxiliary mode actuator is a 3 wire bi-directional electric motor. Ignition 3 voltage, ground and control circuits enable the actuator to operate. The control circuit uses a 0-12 volt linear-ramped signal to command the actuator movement. The 0 and 12 volt control values represent the opposite limits of the actuator range of motion. The values in between 0 and 12 volts correspond to the positions between the limits. When the HVAC control assembly sets a commanded, or targeted, value, the control signal is set to a value between 0-12 volts. The actuator shaft rotates until the commanded position is reached. The module will maintain the control value until a new commanded value is needed.

Air Speed

The HVAC control assembly applies voltage to the blower motor control circuit that corresponds to the selected blower speed. The resistors and the blower motor are in a series circuit. The following list represents the number of resistors in series with the blower motor per particular speed request:

- Low speed-3 resistors
- Medium 1 speed-2 resistors
- Medium 2 speed-1 resistor

When the operator requests High speed, the HVAC control assembly applies voltage to the blower motor relay through the high blower motor control circuit. The voltage energizes the blower motor relay, connecting the blower motor to battery positive voltage.

Auxiliary Air Speed

The auxiliary HVAC control assembly applies voltage to the auxiliary blower motor control circuit that corresponds to the selected blower speed. The resistors and the blower motor are in a series circuit. The following list represents the number of resistors in series with the blower motor per particular speed request:

- Low speed-2 resistors
- Medium speed-1 resistor

When the operator requests High speed, the HVAC control assembly applies voltage to the blower motor relay through the auxiliary high blower motor control circuit. The voltage energizes the blower motor relay, connecting the blower motor to battery positive voltage.

Air Distribution

The HVAC control assembly uses vacuum to control the mode door position. Vacuum is supplied to the control assembly and a vacuum tank by either an engine vacuum source, or a vacuum pump when the vehicle is equipped with a diesel engine..

Vacuum Pump (Diesel Engines)

The electric vacuum pump supplies vacuum to the HVAC control assembly and vacuum tank. When the ignition is ON, voltage is supplied to the vacuum pump from the HVAC fuse. The ground is supplied to the vacuum pump from the chassis.

Mode Switch

The mode switch is a rotary vacuum valve that directly applies vacuum to the appropriate vacuum actuator. Use the mode switch to change the air delivery mode in the vehicle.

MAX A/C–If Equipped

When the operator selects MAX A/C, the mode actuator has vacuum applied to it through the Brown vacuum line, making the vent door open. The recirculation actuator has vacuum applied to it through the Orange vacuum line, making the recirculation door close and allowing air to be recirculated. A/C is forced ON.

A/C–If Equipped

When the operator selects A/C, the mode actuator has vacuum applied to it through the Brown vacuum line, making the vent door open. A/C is forced ON.

Bi-Level Mode

When the operator selects Bi-Level, the following occurs:

- The mode actuator is in neutral position.
- The defrost actuator has vacuum applied to it through the Yellow vacuum line.
- The defrost actuator closes the defrost door, thus opening the heater door though mechanical linkage.
- Vacuum is bled off the mode actuator and the vent door is held stationary in the half open position.

Vent Mode

When the operator selects VENT, the mode actuator has vacuum applied to it through the Yellow vacuum line, making the vent door open.

Floor Mode

When the operator selects FLOOR, the defrost actuator has vacuum applied to it through the Pink vacuum line, pulling the defrost door closed and opening the heater door through mechanical linkage.

Mix-Blend Mode

When the operator selects Mix-Blend, the following occurs:

- Vacuum is bled off the defrost actuator, holding the defrost door stationary in the half-open position. The heater door is also held stationary in the half-open position through mechanical linkage.
- A/C is forced ON.
- Recirculation is not available.

Defrost Mode

When the operator selects Defrost, the following occurs:

- The defrost actuator has vacuum applied to it through the Blue vacuum line, pushing the defrost door open and closing the heater door through mechanical linkage.
- A/C is forced ON.
- Recirculation is not available.

Auxiliary Air Distribution

The HVAC control assembly controls the mode actuator in order to distribute airflow to a desired outlet. When the mode door is moved to the defrost position, the A/C compressor clutch engages and the recirculation actuator will be moved to the outside air position. Regardless of the mode setting, a small amount of air will be diverted to the defrost ducts to reduce windshield fogging. When VENT is selected, the following will occur:

- The mode actuator will be moved to the panel position.
- The recirculation actuator will be placed in the outside air position.
- The A/C compressor will be commanded off.

Recirculation Operation

When the operator selects Recirculation, the HVAC control assembly connects the recirculation door vacuum actuator to the vacuum source. The recirculation actuator retracts, closing the recirculation door. The recirculation operation can function with blower motor in either the ON or OFF position. Recirculation will continue until either outside air is selected or the next ignition cycle. Recirculation is not available in Defrost and Mix-Blend mode.

Air Temperature Description and Operation

The air temperature controls are divided into five areas.

- HVAC Control Components
- Heating and A/C Operation
- Auxiliary Heating and A/C Operation
- Engine Coolant
- A/C Cycle

HVAC CONTROL COMPONENTS

HVAC Control Assembly

The HVAC control assembly is a non-class 2 device that interfaces between the operator and the HVAC system to maintain air temperature and distribution settings. The ignition 3 voltage circuits provide power to the control assembly. Two integrated potentiometers control air temperature door position and blower motor speed. The integrated vacuum system controls the mode door position. The control assembly supports the following features:

Feature	Availability
Afterblow	No
Purge	No
Personalization	No
Actuator Calibration	No

Auxiliary HVAC Control Processor

The auxiliary HVAC control processor controls all outputs for the auxiliary HVAC system. The auxiliary HVAC control processor receives inputs from the front and rear auxiliary HVAC control assemblies. The auxiliary HVAC control processor does not utilize Class 2 communications.

If the auxiliary HVAC control processor receives a 12-volt varied voltage input for an auxiliary air temperature actuator change request. Then the auxiliary HVAC control processor creates a 12-volt varied output for control of the auxiliary air temperature actuator.

Air Temperature Actuator

The air temperature actuator and auxiliary air temperature actuator are a 3-wire bi-directional electric motor. Ignition 3 voltage, ground and control circuits enable the actuator to operate. The control circuit uses a 0–12-volt linear-ramped signal to command the actuator movement. The 0 and 12-volt control values represent the opposite limits of the actuator range of motion. The values in between 0 and 12 volts correspond to the positions between the limits.

When the HVAC control assembly sets a commanded, or targeted, value, the control signal is set to a value between 0–12 volts. The actuator shaft rotates until the commanded position is reached. The module will maintain the control value until a new commanded value is needed.

A/C Pressure Switches

The A/C system is protected by two A/C pressure switches.

- A/C low pressure switch
- A/C high pressure switch

The A/C high pressure switch interrupts the A/C request signal when the A/C line pressure is more than a predetermined value. The A/C low pressure switch interrupts the A/C low pressure switch signal when the A/C line pressure is less than or more than a predetermined value. When the powertrain control module (PCM) stops receiving the required signals, the A/C compressor clutch relay control circuit is no longer grounded, disengaging the A/C compressor clutch. The A/C compressor clutch is disengaged under the following conditions:

- A/C low pressure switch is less than 124 kPa (18 psi).
- A/C low pressure switch is more than 338 kPa (49 psi).
- A/C high pressure switch is more than 2896 kPa (420 psi).

Bypass Valves

The bypass valves included in the air temperature system are:

- Coolant Bypass Valve
- Hot Water Bypass Valve

The bypass valve is a normally open valve, which closes when vacuum is applied to the valve. When the MAX A/C mode is selected, vacuum from the HVAC control assembly is applied to the bypass valve. The vacuum must be strong enough to overcome the tension of the valve's internal return spring in order to close the bypass valve. The return spring forces the valve to return to the open position, when any of the other HVAC modes are selected. In the closed position, the flow of coolant to the heater core is bypassed, allowing maximum cooling to the passenger compartment.

Heating and A/C Operation

The purpose of the heating and A/C system is to provide heated and cooled air to the interior of the vehicle. The A/C system will also remove humidity from the interior and reduce windshield fogging. The vehicle operator can determine the passenger compartment temperature by adjusting the air temperature switch. Regardless of the temperature setting, the following can effect the rate that the HVAC system can achieve the desired temperature:

- Recirculation
- Difference between inside and desired temperature
- Difference between ambient and desired temperature
- Blower motor speed setting
- Mode setting
- Auxiliary HVAC settings

The A/C system can be engaged by placing the mode switch in one of the following positions:

- Max A/C
- A/C
- Bi-Level
- Blend
- Defrost

The A/C system can operate regardless of the temperature setting. Regardless of the selected A/C mode setting, a request is sent to the PCM to turn on the A/C compressor clutch.

The following conditions must be met in order for the PCM to turn on the compressor clutch:

- Ambient air temperature is greater than 3°C (38°F)
- Engine coolant temperature (ECT) is less than 123°C (253°F)
- Engine speed is less than 5000 RPM
- The A/C compressor cycling switch pressure is between 124-388 kPa (18-49 psi)
- The A/C high pressure cutout switch is less than 2896 kPa (420 psi)

Once engaged, the compressor clutch will be disengaged for the following conditions:

- Throttle position is 100 percent
- The A/C compressor cycling switch pressure is less than 124 kPa (18 psi) or more than 338 kPa (49 psi)
- The A/C high pressure cutout switch is more than 2896 kPa (420 psi)
- Engine coolant temperature (ECT) is more than 123°C (253°F)
- Engine speed is more than 5000 RPM
- Transmission shift
- PCM detects excessive torque load
- PCM detects insufficient idle quality
- PCM detects a hard launch condition

When the compressor clutch disengages, the compressor clutch diode protects the electrical system from a voltage spike.

Heater Mode – Auxiliary Heater without A/C

The auxiliary blower motor recycles air from the vehicle's interior. The vehicle operator can determine the intensity of the auxiliary heater by placing the auxiliary blower motor in one of the following positions:

- Low
- Med
- High

Since there is no temperature switch, the temperature is controlled by the speed of the auxiliary blower motor. The auxiliary blower motor will only operate when the ignition is in the RUN position, and the auxiliary blower motor switch is in any position other than OFF.

Heater Mode – Front Auxiliary HVAC Control Assembly Only

The auxiliary temperature switch in the front auxiliary HVAC control assembly allows the vehicle operator to adjust the temperature in the rear of the vehicle. Power is provided to both the front auxiliary HVAC control assembly and the auxiliary air temperature actuator from the instrument panel (I/P) fuse block on the ignition 3 voltage circuit.

Voltage delivered to the front auxiliary HVAC control assembly on the ignition 3 voltage circuit is sent to a variable resistor. Based on the placement of the temperature switch, a varied voltage is sent to the auxiliary air temperature actuator on the auxiliary air temperature door control circuit. The auxiliary air temperature actuator positions the temperature door to divert the appropriate amount of air past the heater core in order to achieve the desired temperature.

Heater Mode – Front Auxiliary HVAC Control Assembly with Rear Auxiliary HVAC Control Assembly

The auxiliary temperature switch in the front auxiliary HVAC control assembly allows the vehicle operator to adjust the temperature in the rear of the vehicle. Power is provided to both the front auxiliary HVAC control assembly and the auxiliary air temperature actuator from the (I/P) fuse block on the ignition 3 voltage circuit.

Voltage delivered to the front auxiliary HVAC control assembly on the ignition 3 voltage circuit is sent to a varied resistor. Based on the placement of the temperature switch, a varied voltage is sent to the auxiliary air temperature actuator on the auxiliary air temperature door control circuit, and auxiliary HVAC control processor. The auxiliary air temperature actuator positions the temperature door to divert the appropriate amount of air past the heater core in order to achieve the desired temperature

Heater Mode – Rear Auxiliary HVAC Control Assembly

The auxiliary temperature switch in the rear auxiliary HVAC control assembly allows the rear seat passengers to adjust the temperature in the rear of the vehicle. Power is provided to the rear auxiliary HVAC control assembly, auxiliary HVAC control processor and the auxiliary air temperature actuator from the (I/P) fuse block on the ignition 3 voltage circuit.

To activate the rear auxiliary HVAC control assembly, the front auxiliary HVAC control assembly must be placed in the REAR CNTL position. Ignition 3 voltage is sent to the auxiliary HVAC control processor. When the switch is placed in the REAR CNTL position, the voltage is grounded through the auxiliary blower motor switch control, front auxiliary HVAC control assembly and the ground circuit to allow the rear auxiliary HVAC control assembly to operate the auxiliary temperature actuator. Voltage delivered to the rear auxiliary HVAC control assembly on the ignition 3 voltage circuit is sent to a variable resistor. Based on the placement of the temperature switch, a varied voltage is sent to the auxiliary air temperature actuator on the auxiliary air temperature door control circuit, and auxiliary HVAC control processor. The auxiliary air temperature actuator positions the temperature door to divert the appropriate amount of air past the heater core in order to achieve the desired temperature.

A/C Mode – Front Auxiliary HVAC Control Assembly Only

The auxiliary temperature switch in the front auxiliary HVAC control assembly allows the vehicle operator to adjust the temperature in the rear of the vehicle. Power is provided to both the front auxiliary HVAC control assembly and the auxiliary air temperature actuator from the (I/P) fuse block on the ignition 3 voltage circuit.

Voltage delivered to the front auxiliary HVAC control assembly on the ignition 3 voltage circuit is sent to a variable resistor. Based on the placement of the temperature switch, a varied voltage is sent to the auxiliary air temperature actuator on the auxiliary air temperature door control circuit. The auxiliary air temperature actuator positions the temperature door to divert the appropriate amount of air past the heater core in order to achieve the desired temperature.

A/C Mode – Front Auxiliary HVAC Control Assembly with Rear Auxiliary HVAC Control Assembly

The auxiliary temperature switch in the front auxiliary HVAC control assembly allows the vehicle operator to adjust the temperature in the rear of the vehicle. Power is provided to both the front auxiliary HVAC control assembly and the auxiliary air temperature actuator from the (I/P) fuse block on the ignition 3 voltage circuit.

Voltage delivered to the front auxiliary HVAC control assembly on the ignition 3 voltage circuit is sent to a variable resistor. Based on the placement of the temperature switch, a varied voltage is sent to the auxiliary air temperature actuator on the auxiliary air temperature door control circuit, and auxiliary HVAC control processor. The auxiliary air temperature actuator positions the temperature door to divert the appropriate amount of air past the heater core in order to achieve the desired temperature.

A/C Mode – Rear Auxiliary HVAC Control Assembly

The auxiliary temperature switch in the rear auxiliary HVAC control assembly allows the rear seat passengers to adjust the temperature in the rear of the vehicle. Power is provided to the rear auxiliary HVAC control assembly, auxiliary HVAC control processor and the auxiliary air temperature actuator from the (I/P) fuse block on the ignition 3 voltage circuit.

To activate the rear auxiliary HVAC control assembly, the front auxiliary HVAC control assembly must be placed in the REAR CNTL position. Ignition 3 voltage is sent to the auxiliary HVAC control processor. When the switch is placed in the REAR CNTL position, the voltage is grounded through the auxiliary blower motor switch control, front auxiliary HVAC control assembly and the ground circuit to allow the rear auxiliary HVAC control assembly to operate the auxiliary temperature actuator. Voltage delivered to the rear auxiliary HVAC control assembly on the ignition 3 voltage circuit is sent to a varied resistor. Based on the placement of the temperature switch, a varied voltage is sent to the auxiliary air temperature actuator on the auxiliary air temperature door control circuit, and auxiliary HVAC control processor. The auxiliary air temperature actuator positions the temperature door to divert the appropriate amount of air past the heater core in order to achieve the desired temperature.

Engine Coolant

Engine coolant is the key element of the heating system. The thermostat controls engine operating coolant temperature. The thermostat also creates a restriction for the cooling system that promotes a positive coolant flow and helps prevent cavitation. Coolant enters the heater core through the inlet heater hose, in a pressurized state.

The heater core is located inside the HVAC module. The heat of the coolant flowing through the heater core is absorbed by the ambient air drawn through the HVAC module. Heated air is distributed to the passenger compartment, through the HVAC module, for passenger comfort.

The amount of heat delivered to the passenger compartment is controlled by opening or closing the HVAC module air temperature door. The coolant exits the heater core through the return heater hose and recirculated back through the engine cooling system.

Coolant Heater (K08)

The coolant heater function is to provide additional heat to the passenger compartment. The coolant heater burns diesel fuel, to heat up the engine coolant when the vehicle is running and will only operate during conditions where ambient temperature is below 4°C (39°F) and a fuel tank level greater than 12.5 percent. The heat of the hot engine coolant is transferred to the HVAC module to heat the passenger compartment. The coolant heater does not heat up instantly. It must go through a self test and start up procedure before normal operation. The vehicle must be running to start the unit but after the unit is no longer commanded on a two minute shut down (purge) procedure starts. The coolant flow is from the engine to the fuel operated heater through the heat exchanger back to the engine.

Battery voltage and ground is supplied to the coolant heater. The electronic control unit inside the coolant heater determines when the unit will turn ON and OFF as well as how it will function. The electronic control unit also uses GMLAN communication and the engine control module (ECM) to transfer coolant heater information that the scan tool can read. The fuel operated heater contains flame sensors to disable the glow plug once the flame is established or to abort the startup attempt if the flame is not established.

Inputs to the coolant heater electronic control unit:

- Coolant sensor
- Overheat sensor
- Combustion sensor
- GMLAN ECM

Outputs from the coolant heater electronic control unit:

- Fuel pump
- Glow plug

- Blower motor
- GMLAN ECM

The coolant heater controls the coolant temperature with 3 operating modes.

- HIGH—If coolant temperature is in a range between −40 to +75°C (−40 to +176°F), the coolant heater fuel pump will pump fuel at maximum capacity to increase the coolant temperature as fast as possible. Note: Ambient temperature must be below 4°C (39°F), fuel tank level greater than 12.5 percent and the engine should be running.
- LOW—If coolant temperature is in a range between 85–90°C (185–194°F), the coolant heater fuel pump will pump fuel at minimum capacity to increase the coolant temperature at a slower rate.
- OFF—If coolant temperature is above 90°C (195°F), the coolant heater fuel pump will stop pumping fuel and allow the remaining fuel in the combustion chamber to burn out. The coolant heater fuel pump will not start pumping fuel again until the coolant temperature reaches 75°C (167°F).

FUNCTIONAL PRINCIPLES:

- The vehicle coolant pump continuously circulates the coolant over the heat exchanger inside the fuel operated heater and throughout the coolant system.
- The coolant heater fuel pump pumps the fuel from the vehicle fuel tank to the combustion chamber.
- Coolant heater blower blows the oxygen, which is necessary for the combustion process, into the combustion chamber.
- A Coolant heater glow plug generates the evaporation energy and creates the temperature which is necessary to ignite the Air-Fuel mixture
- The heat exchanger inside the fuel operated heater transfers the energy of the combustion process into the engine coolant.
- Depending on the coolant temperature, which is detected by the coolant sensors, the heater chooses either high or low setting or gets shut off.

SELF TEST OF THE UNIT:

Before every start of the heater, the operation of the individual components is tested.

- Fuel operated heater control unit check
- Flame sensor
- Coolant sensor
- Overheating sensor
- Glow plug
- Fuel pump
- Blower motor

The fuel operated heater will only start after the self test of the heating unit is successful. Should a fault be detected, a fault notification will be output through the vehicle diagnosis.

DESCRIPTION OF SAFETY MECHANISM :

During start up the ECU is performing a random access memory (RAM), read-only memory (ROM) and electrically erasable programmable read-only memory (EEPROM) test. If failures occur during a self test of the unit, the unit will not start.

- If the power supply voltage exceeds 16 volts the unit will not start or shut off with after purge time of 120 seconds.
- If the power supply voltage goes below 10.2 V for more than 40 seconds the unit will shut off and try to restart after a purge time of 120 seconds. If the failure occurs 3 times, then unit is not going to restart till next key off.

Description of component checks:

- Coolant Heater Blower Motor—After the unit is commanded on and before normal operation the blower is tested for an open circuit. While the heater is activated the blower is tested for a short to ground.
- Flame sensor—The flame sensor is tested continuously during operation for a short to ground, short to voltage or open circuit.
- Glow plug—After the unit is commanded and before normal operation the glow plug is tested for an open circuit. While the heater is activated the glow plug is tested for a short to ground.
- Coolant Heater Fuel Pump—After the coolant heater is commanded on and before normal operation is activated, the fuel pump is tested for an open circuit. While the coolant heater is activated the fuel pump is tested for a short to ground.
- Overheating Sensor and Coolant sensor—The overheat sensor and coolant sensor are tested continuously during operation for a short to ground, short to voltage or open circuit.

FIRST START OF THE UNIT (125 seconds):

After the self test was successfully completed a first start procedure sequence is attempted.

1. The ceramic glow plug starts to heat the combustion chamber.
2. After a delay, the blower switches on. During the start procedure, the blower continuously increases blowing speed.
3. The fuel pump pumps fuel into the combustion chamber. The cycle frequency of the fuel pump is also continuously increased during the start procedure.
4. The glow plug starts to vaporize the fuel, and creates the temperature to ignite the fuel.
5. After ignition, the heater runs continuously to reach the maximum heating power.
6. After the flame sensor has detected the flame, the start procedure is complete, and the glow plug switches off.

SECOND START OF THE UNIT (125 seconds):

If the first start is not successful, the heater attempts a second restart process. In doing this, the glow plug voltage is increased, in order to obtain better starting conditions. The first start sequence is then repeated.

UNSUCCESSFUL SECOND START:

If the second start is not successful in igniting the heater, a fault code is output from the heater.

- A new attempt to start will only occur after the ignition switch is cycled.
- After 10 failed ignition cycles one after the other, all further start attempts are stopped by the control unit. This inhibit state can only be released by clearing the codes with a scan tool.

A/C Cycle

Refrigerant is the key element in an air conditioning system. R-134a is presently the only EPA approved refrigerant for automotive use. R-134a is an very low temperature gas that can transfer the undesirable heat and moisture from the passenger compartment to the outside air.

The A/C compressor is belt driven and operates when the magnetic clutch is engaged. The compressor builds pressure on the vapor refrigerant. Compressing the refrigerant also adds heat to the refrigerant. The refrigerant is discharged from the compressor, through the discharge hose, and forced to flow to the condenser and then through the balance of the A/C system. The A/C system is mechanically protected with the use of a high pressure relief valve. If the high pressure switch were to fail or if the refrigerant system becomes restricted and refrigerant pressure continued to rise, the high pressure relief will pop open and release refrigerant from the system.

Compressed refrigerant enters the condenser in a high temperature, high pressure vapor state. As the refrigerant flows through the condenser, the heat of the refrigerant is transferred to the ambient air passing through the condenser. Cooling the refrigerant causes the refrigerant to condense and change from a vapor to a liquid state.

The condenser is located in front of the radiator for maximum heat transfer. The condenser is made of aluminum tubing and aluminum cooling fins, which allows rapid heat transfer for the refrigerant. The semi-cooled liquid refrigerant exits the condenser and flows through the liquid line, to the orifice tube.

The orifice tube is located in the liquid line between the condenser and the evaporator. The orifice tube is the dividing point for the high and the low pressure sides of the A/C system. As the refrigerant passes through the orifice tube, the pressure on the refrigerant is lowered. Due to the pressure differential on the liquid refrigerant, the refrigerant will begin to vaporize at the orifice tube. The orifice tube also meters the amount of liquid refrigerant that can flow into the evaporator.

Refrigerant exiting the orifice tube flows into the evaporator core in a low pressure, liquid state. Ambient air is drawn through the HVAC module and passes through the evaporator core. Warm and moist air will cause the liquid refrigerant boil inside of the evaporator core. The boiling refrigerant absorbs heat from the ambient air and draws moisture onto the evaporator. The refrigerant exits the evaporator through the suction line and back to the compressor, in a vapor state, and completing the A/C cycle of heat removal. At the compressor, the refrigerant is compressed again and the cycle of heat removal is repeated.

The conditioned air is distributed through the HVAC module for passenger comfort. The heat and moisture removed from the passenger compartment will also change form, or condense, and is discharged from the HVAC module as water.

A/C Cycle with Auxiliary

The auxiliary A/C system operates from the vehicles primary A/C system. The front or primary A/C system must be ON to allow the rear A/C system to function.

Refrigerant is the key element in an air conditioning system. R-134a is presently the only EPA approved refrigerant for automotive use. R-134a is an very low temperature gas that can transfer the undesirable heat and moisture from the passenger compartment to the outside air.

The A/C system used on this vehicle is a non cycling system. Non cycling A/C systems use a high pressure switch to protect the A/C system from excessive pressure. The high pressure switch will OPEN the electrical signal, to the compressor clutch, in the event that the refrigerant pressure becomes excessive. After the high and low side of the A/C system pressure equalize, the high pressure switch will CLOSE. Closing the high pressure switch will complete the electrical circuit to the compressor clutch. The A/C system is also mechanically protected with the use of a high pressure relief valve. If the high pressure switch were to fail or if the refrigerant system becomes restricted and refrigerant pressure continued to rise, the high pressure relief will pop open and release refrigerant from the system.

The A/C compressor is belt driven and operates when the magnetic clutch is engaged. The compressor builds pressure on the vapor refrigerant. Compressing the refrigerant also adds heat to the refrigerant. The refrigerant is discharged from the compressor, through the discharge hose, and forced to flow to the condenser and then through the balance of the A/C system.

Compressed refrigerant enters the condenser in a high temperature, high pressure vapor state. As the refrigerant flows through the condenser, the heat of the refrigerant is transferred to the ambient air passing through the condenser. Cooling the refrigerant causes the refrigerant to condense and change from a vapor to a liquid state.

The condenser is located in front of the radiator for maximum heat transfer. The condenser is made of aluminum tubing and aluminum cooling fins, which allows rapid heat transfer for the refrigerant. The semi-cooled liquid refrigerant exits the condenser and flows through the liquid line. The liquid line flow is split and the liquid refrigerant flows to both the front or primary A/C system, and to the liquid line for the rear A/C system.

The liquid refrigerant, flowing to the rear A/C system, flows into the rear TXV. The rear TXV is located at the rear evaporator inlet. The TXV is the dividing point for the high and the low pressure sides of the rear A/C system. As the refrigerant passes through the TXV, the pressure on the refrigerant is lowered. Due to the pressure differential on the liquid refrigerant, the refrigerant will begin to boil at the expansion device. The TXV also meters the amount of liquid refrigerant that can flow into the evaporator.

Refrigerant exiting the TXV flows into the evaporator core in a low pressure, liquid state. Ambient air is drawn through the rear A/C module and passes through the evaporator core. Warm and moist air will cause the liquid refrigerant boil inside of the evaporator core. The boiling refrigerant absorbs heat from the ambient air and draws moisture onto the evaporator. The refrigerant exits the evaporator through the suction line and back to the primary A/C systems suction line. Refrigerant in the primary A/C system suction line flows back to the compressor, in a vapor state, and completes the A/C cycle of heat removal. At the compressor, the refrigerant is compressed again and the cycle of heat removal is repeated.

The conditioned air is distributed through the rear A/C module for passenger comfort. The heat and moisture removed from the rear passenger compartment will also change form, or condense, and is discharged from the rear A/C module as water.

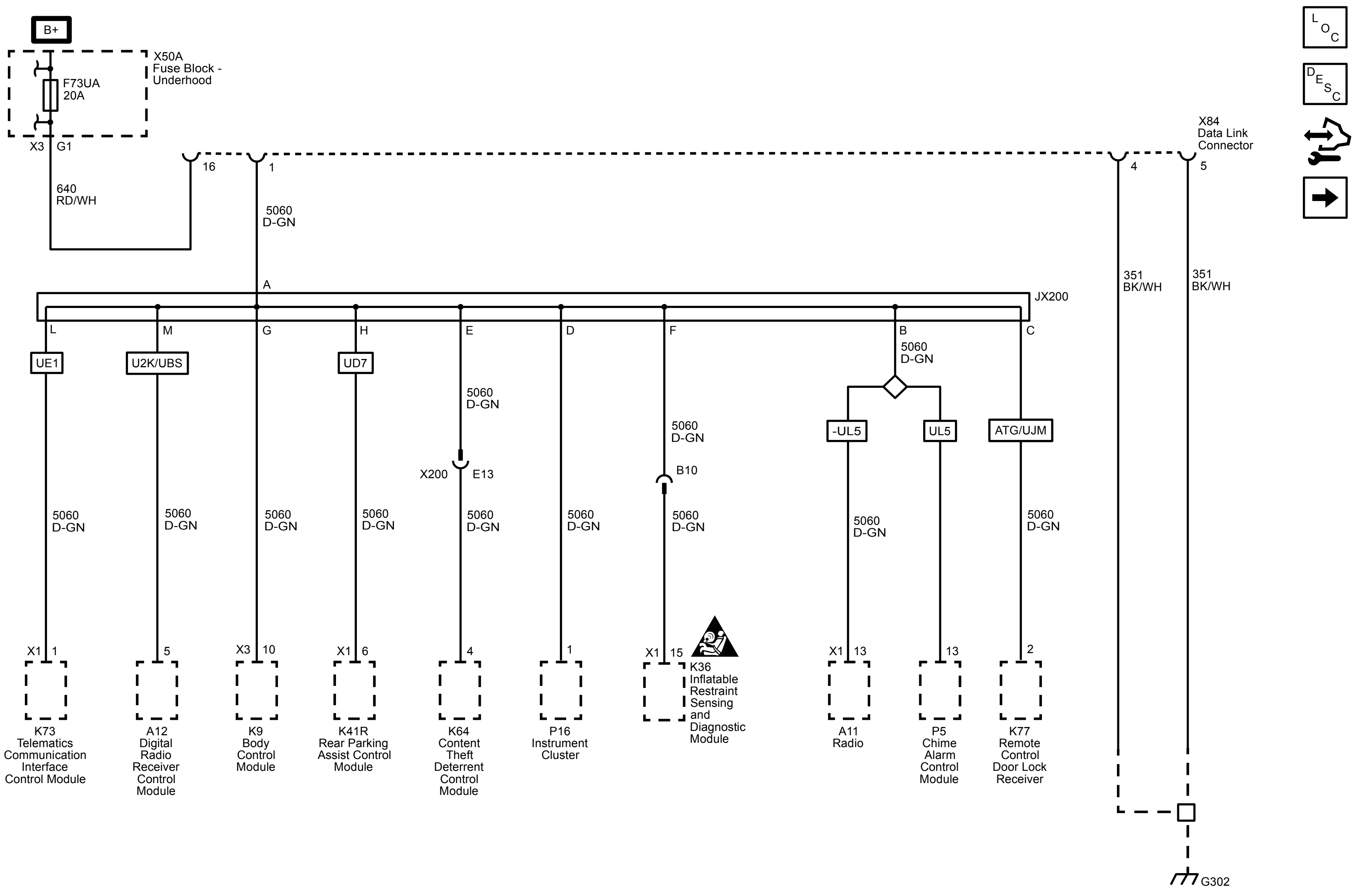
Power and Signal Distribution

Data Communications

Schematic and Routing Diagrams

Data Communication Schematics

Low Speed GMLAN (except FHZ)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D-GN
X84
Data Link Connector
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5
351
BK/WH
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BK/WH
A
JX200
L
M
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E
D
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UE1
U2K/UBS
UD7
5060
D-GN
X200
E13
B10
-UL5
UL5
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X1 1
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X3 10
X1 6
4
1
X1 15
X1 13
13
2
K73
Telematics Communication Interface Control Module
A12
Digital Radio Receiver Control Module
K9
Body Control Module
K41R
Rear Parking Assist Control Module
K64
Content Theft Deterrent Control Module
P16
Instrument Cluster
K36
Inflatable Restraint Sensing and Diagnostic Module
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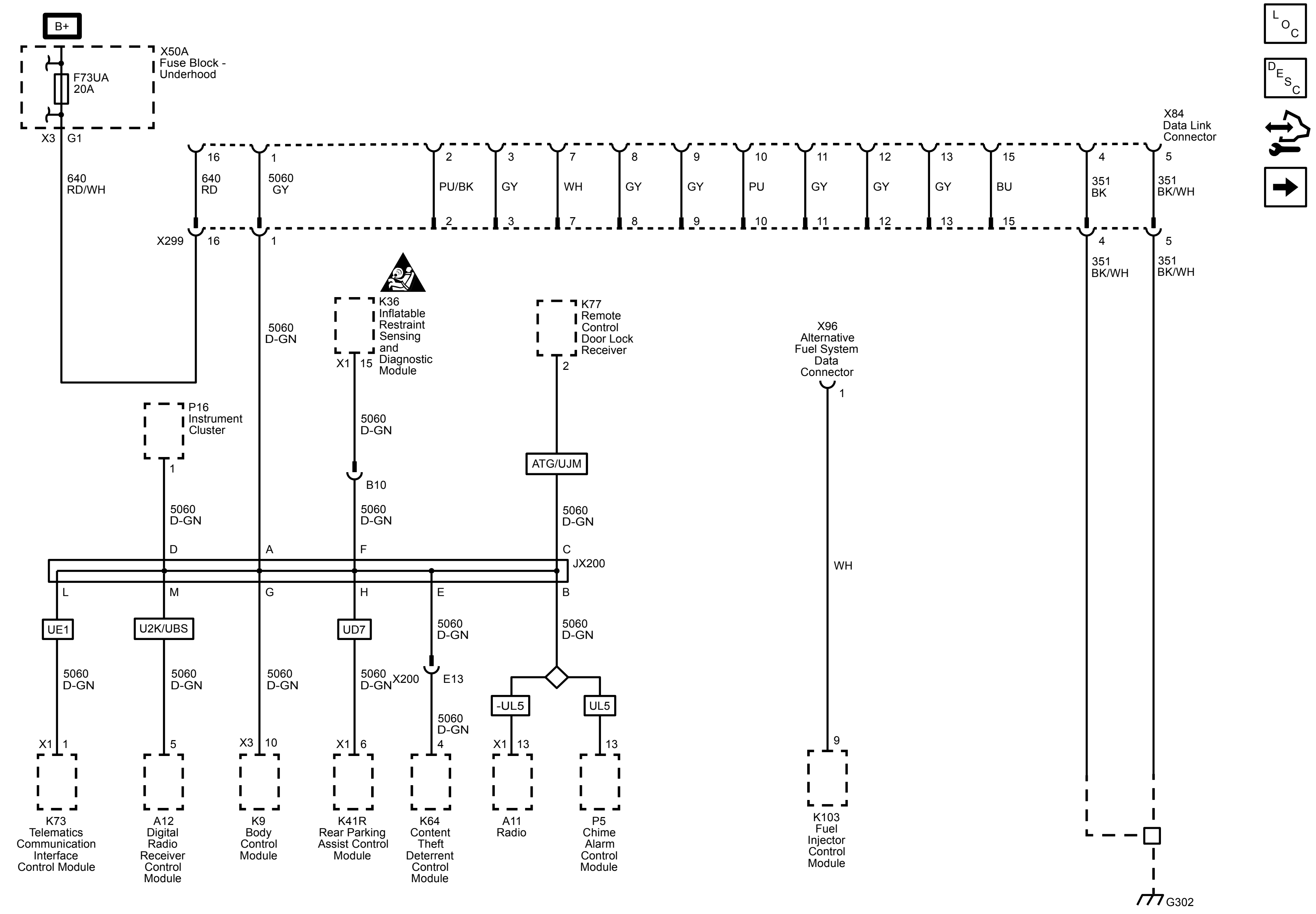
Radio
P5
Chime Alarm Control Module
K77
Remote Control Door Lock Receiver
G302
LOC
DESC

Low Speed GMLAN (FHZ) and Alternative Fuel Data Connector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B+
X50A
Fuse Block -
Underhood
F73UA
20A
X3 G1
640
RD/WH
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Data Link
Connector
16 640 RD
1 5060 GY
2 PU/BK
3 GY
7 WH
8 GY
9 GY
10 PU
11 GY
12 GY
13 GY
15 BU
4 351 BK
5 351 BK/WH
X299
16
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5060
D-GN
K36
Inflatable
Restraint
Sensing
and
Diagnostic
Module
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5060
D-GN
B10
K77
Remote
Control
Door Lock
Receiver
2
ATG/UJM
5060
D-GN
X96
Alternative
Fuel System
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Connector
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WH
9
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Fuel
Injector
Control
Module
P16
Instrument
Cluster
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5060
D-GN
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A
F
C
JX200
L
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G
H
E
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UE1
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X1 1
5
X3 10
X1 6
4
X1 13
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K73
Telematics
Communication
Interface
Control Module
A12
Digital
Radio
Receiver
Control
Module
K9
Body
Control
Module
K41R
Rear Parking
Assist Control
Module
K64
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Theft
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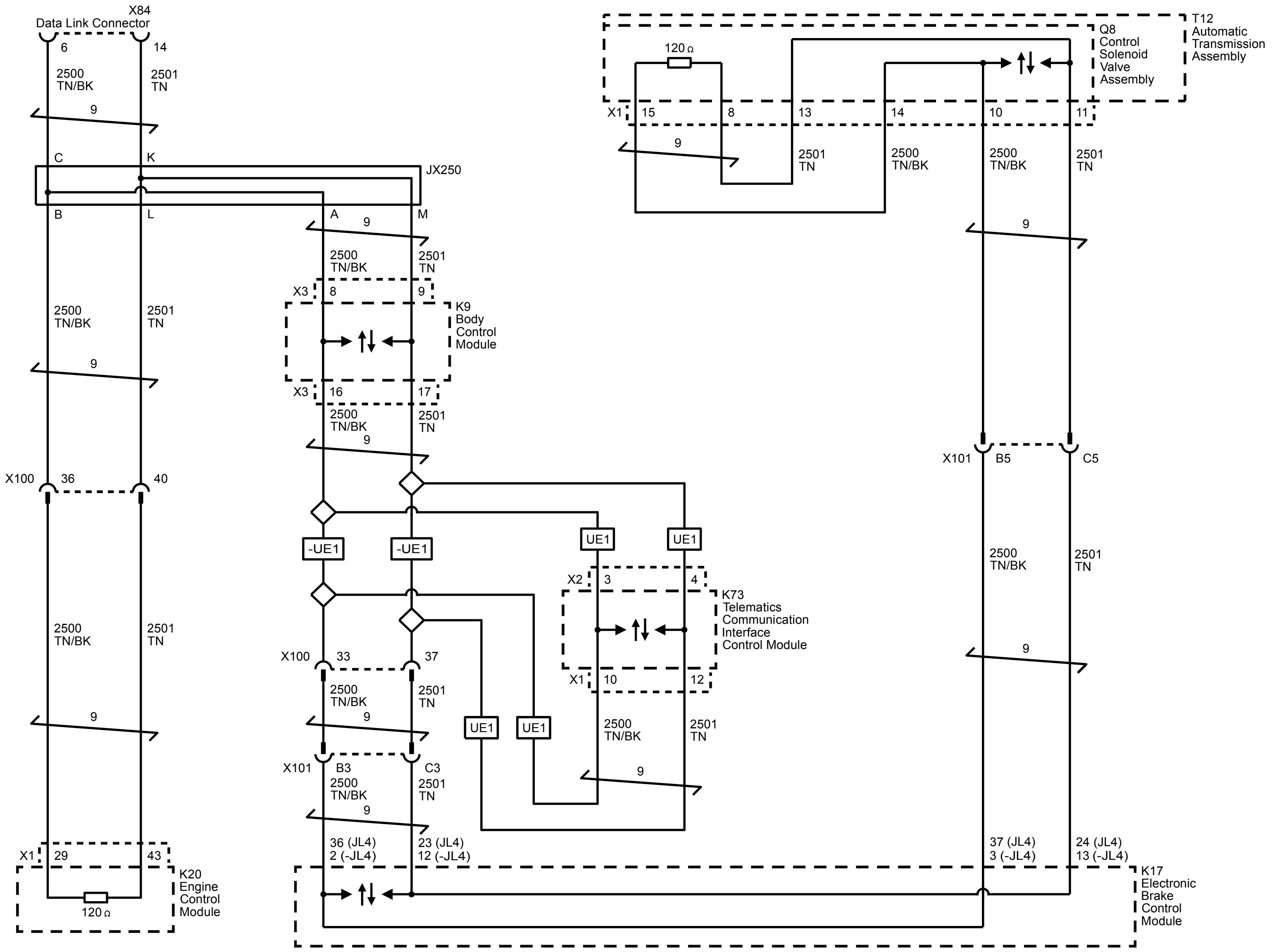
Radio
P5
Chime
Alarm
Control
Module
G302

High Speed GMLAN (Gas except FHZ)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TN/BK
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TN
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X3
8
9
K9
Body
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Module
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2500
TN/BK
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TN
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X100
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40
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UE1
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K73
Telematics
Communication
Interface
Control Module
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TN
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UE1
UE1
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TN
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X101
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C3
2500
TN/BK
2501
TN
9
36 (JL4)
2 (-JL4)
23 (JL4)
12 (-JL4)
37 (JL4)
3 (-JL4)
24 (JL4)
13 (-JL4)
K17
Electronic
Brake
Control
Module
X1
29
43
K20
Engine
Control
Module
120 Ω
120 Ω
Q8
Control
Solenoid
Valve
Assembly
T12
Automatic
Transmission
Assembly
X1
15
8
13
14
10
11
9
2501
TN
2500
TN/BK
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2501
TN
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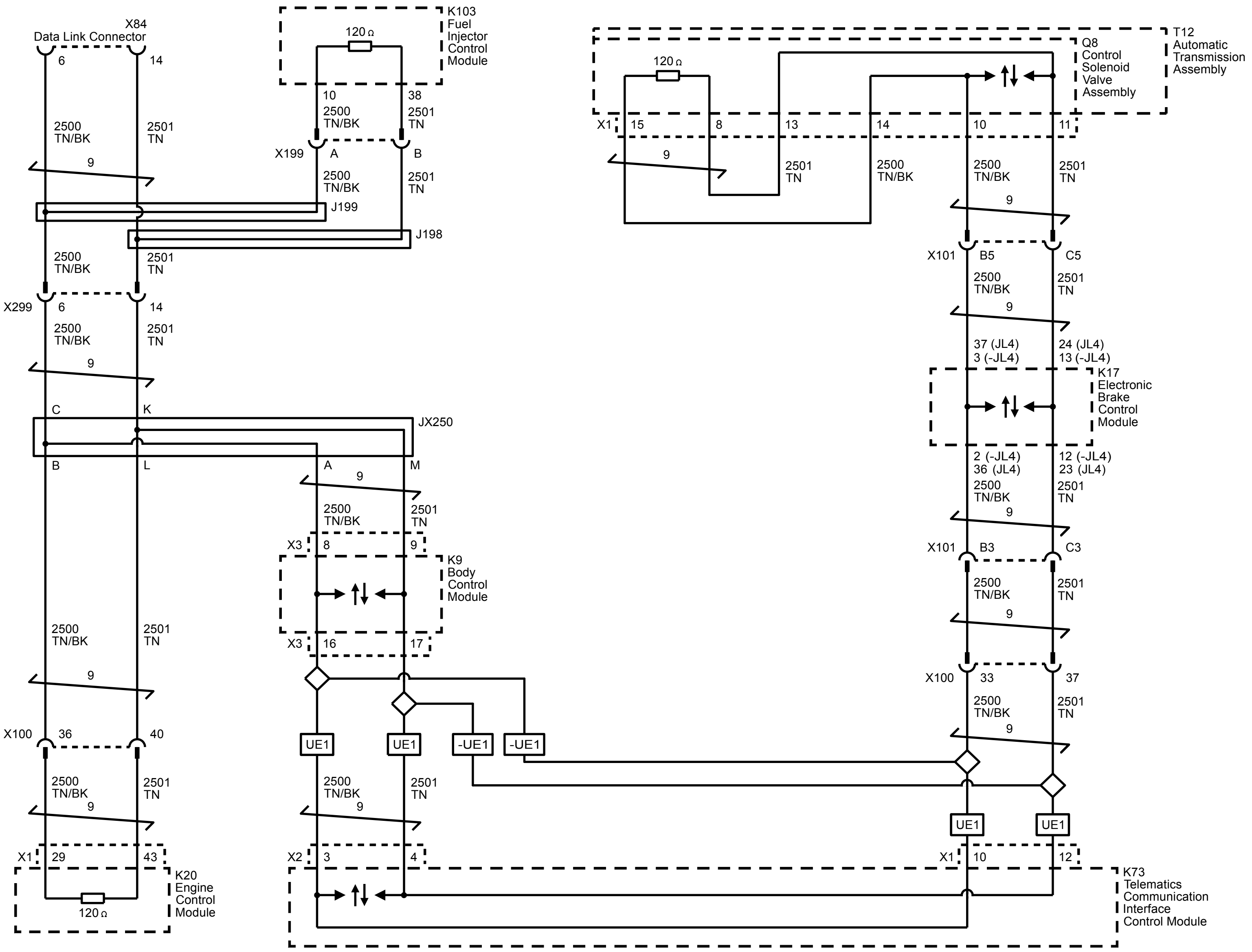
High Speed GMLAN (Gas with FHZ)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J198
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TN/BK
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X299
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TN/BK
2501
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JX250
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2500
TN/BK
2501
TN
X3
8
9
K9
Body
Control
Module
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TN
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Engine
Control
Module
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UE1
UE1
-UE1
-UE1
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TN/BK
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TN
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Q8
Control
Solenoid
Valve
Assembly
T12
Automatic
Transmission
Assembly
X1
15
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2500
TN/BK
2500
TN/BK
2501
TN
9
X101
B5
C5
2500
TN/BK
2501
TN
9
37 (JL4)
3 (-JL4)
24 (JL4)
13 (-JL4)
K17
Electronic
Brake
Control
Module
2 (-JL4)
36 (JL4)
12 (-JL4)
23 (JL4)
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TN/BK
2501
TN
9
X101
B3
C3
2500
TN/BK
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9
X100
33
37
2500
TN/BK
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TN
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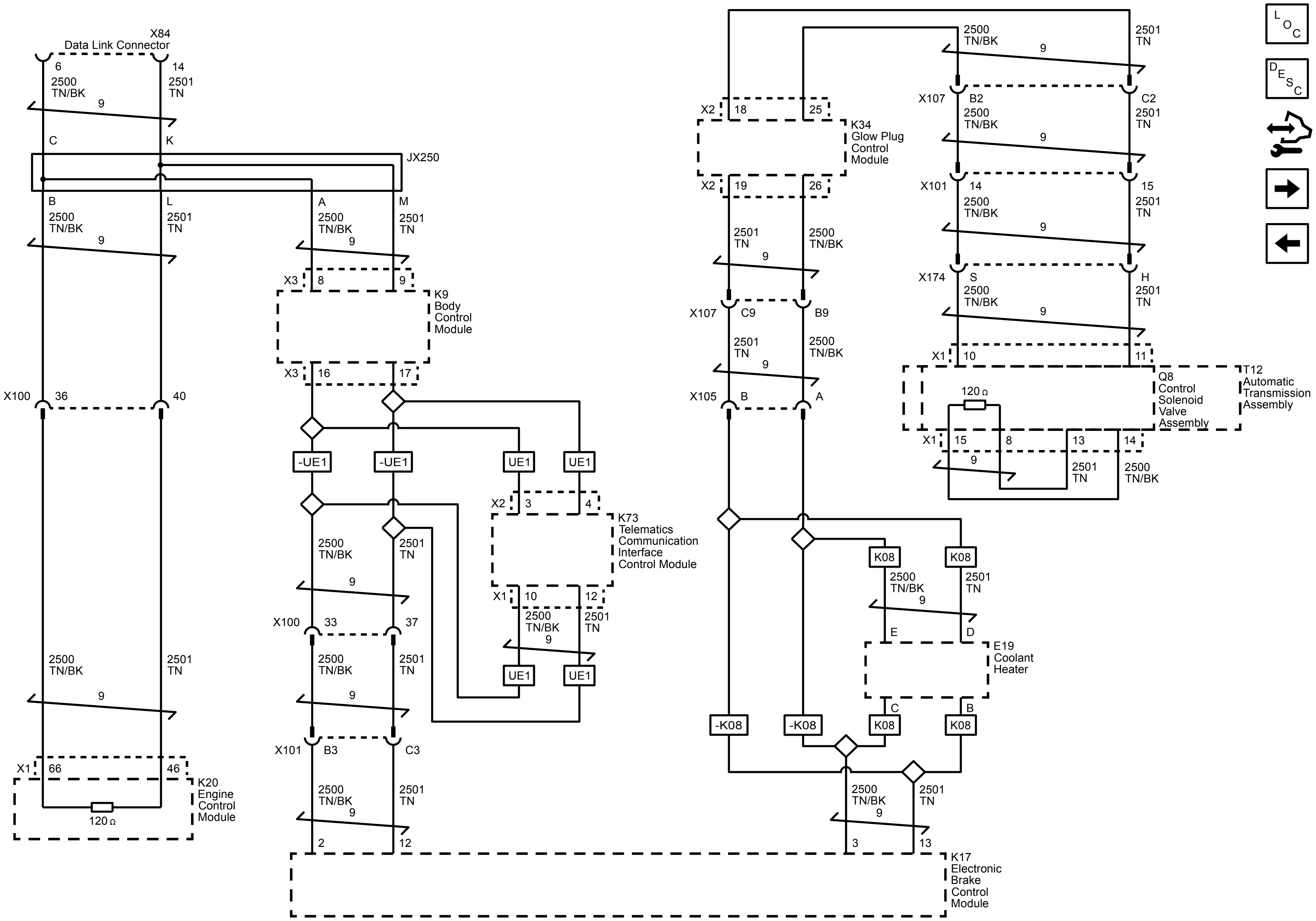
UE1
UE1
X1
10
12
K73
Telematics
Communication
Interface
Control Module

High Speed GMLAN (Diesel)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TN/BK
2501
TN
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M
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TN/BK
2501
TN
9
X3
8
9
K9
Body
Control
Module
X3
16
17
-UE1
-UE1
UE1
UE1
X2
3
4
K73
Telematics
Communication
Interface
Control Module
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UE1
UE1
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C3
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120 Ω
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Engine
Control
Module
2
12
3
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Electronic
Brake
Control
Module
X2
18
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K34
Glow Plug
Control
Module
X2
19
26
X107
C9
B9
X105
B
A
-K08
-K08
K08
K08
E
D
E19
Coolant
Heater
C
B
K08
K08
X107
B2
C2
X101
14
15
X174
S
H
X1
10
11
120 Ω
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Solenoid
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8
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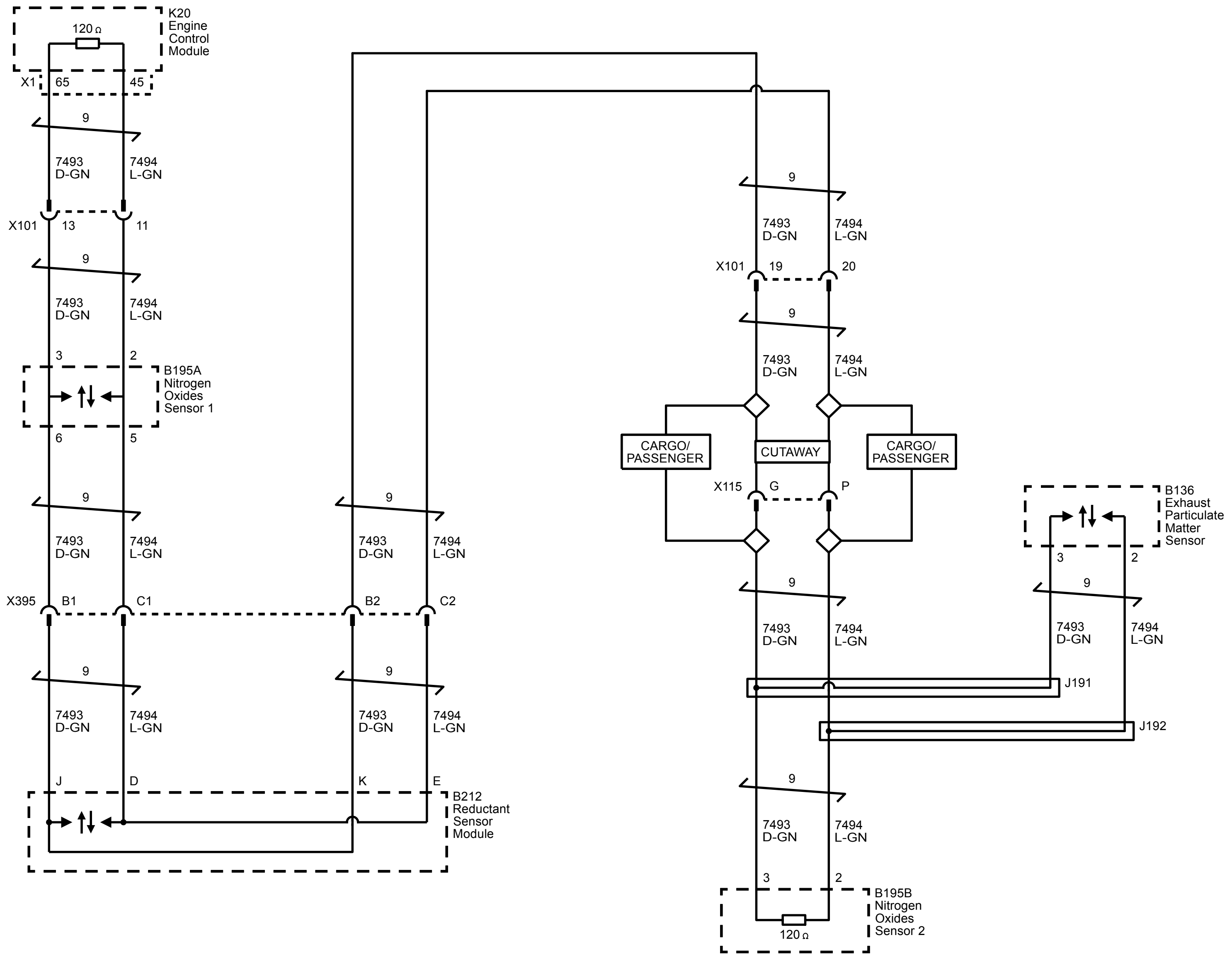
14

Powertrain Expansion Bus (LWN)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Engine
Control
Module
120 Ω
X1
65
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D-GN
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L-GN
X101
13
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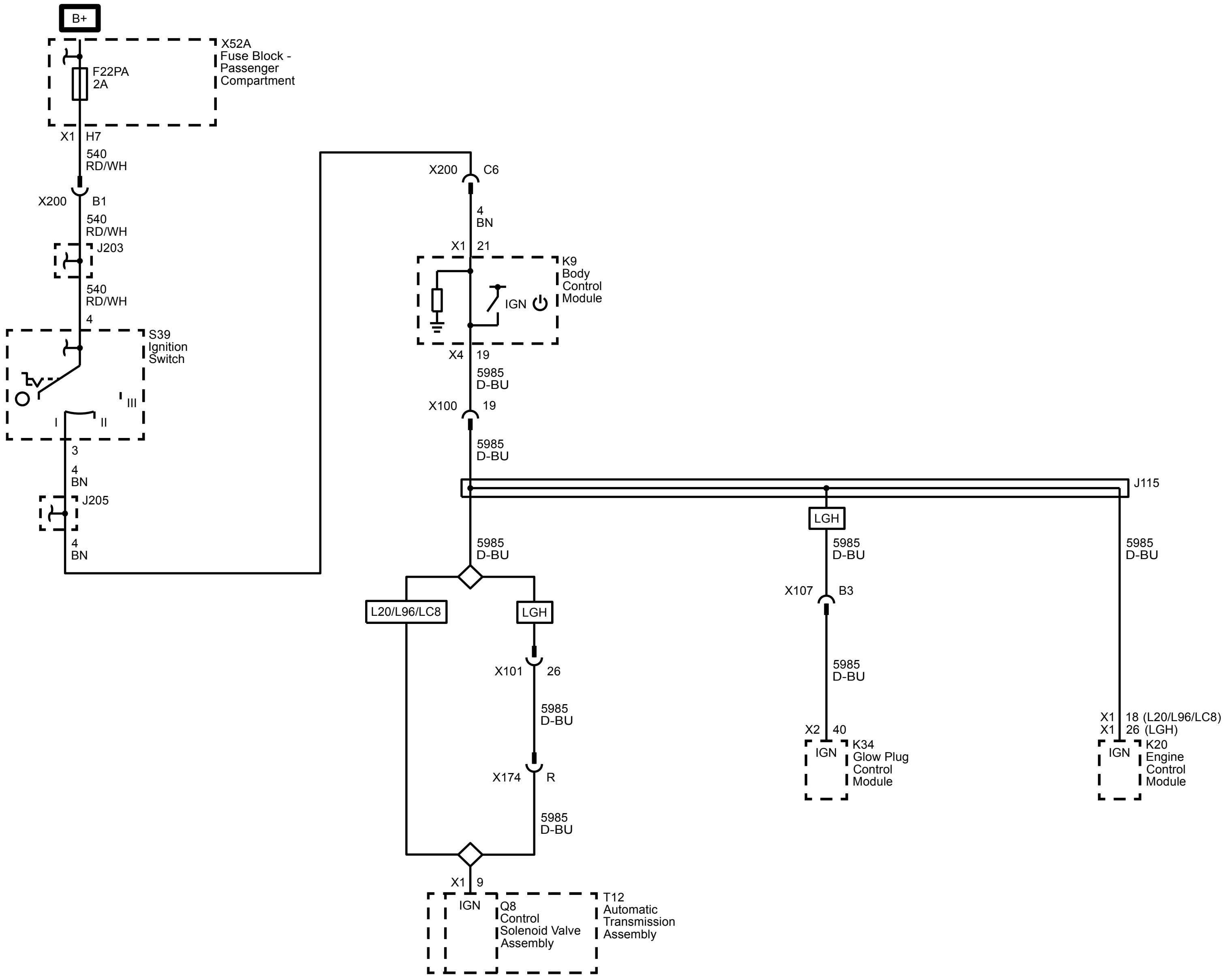
3
2
B195A
Nitrogen
Oxides
Sensor 1
6
5
X395
B1
C1
B2
C2
J
D
K
E
B212
Reductant
Sensor
Module
X101
19
20
CARGO/
PASSENGER
CUTAWAY
CARGO/
PASSENGER
X115
G
P
B136
Exhaust
Particulate
Matter
Sensor
3
2
J191
J192
3
2
B195B
Nitrogen
Oxides
Sensor 2
120 Ω

LOC
DESC

Accessory Wakeup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Fuse Block -
Passenger
Compartment
F22PA
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H7
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RD/WH
X200
B1
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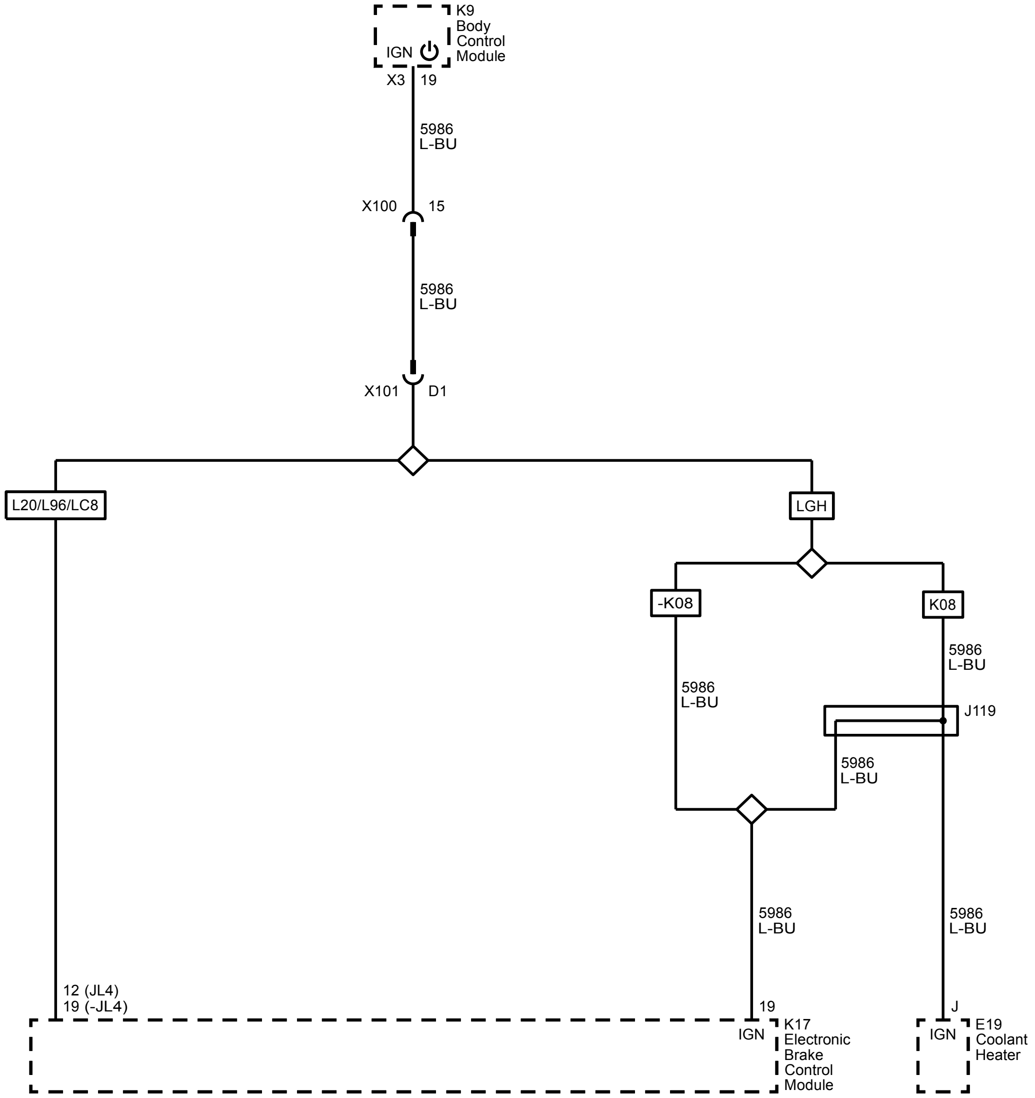
RD/WH
J203
540
RD/WH
4
S39
Ignition
Switch
I
II
III
3
4
BN
J205
4
BN
X200
C6
4
BN
X1
21
K9
Body
Control
Module
IGN
X4
19
5985
D-BU
X100
19
5985
D-BU
J115
5985
D-BU
L20/L96/LC8
LGH
X101
26
5985
D-BU
X174
R
5985
D-BU
X1
9
IGN
Q8
Control
Solenoid Valve
Assembly
T12
Automatic
Transmission
Assembly
LGH
5985
D-BU
X107
B3
5985
D-BU
X2
40
IGN
K34
Glow Plug
Control
Module
5985
D-BU
X1 18 (L20/L96/LC8)
X1 26 (LGH)
IGN
K20
Engine
Control
Module

Communications Enable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X100
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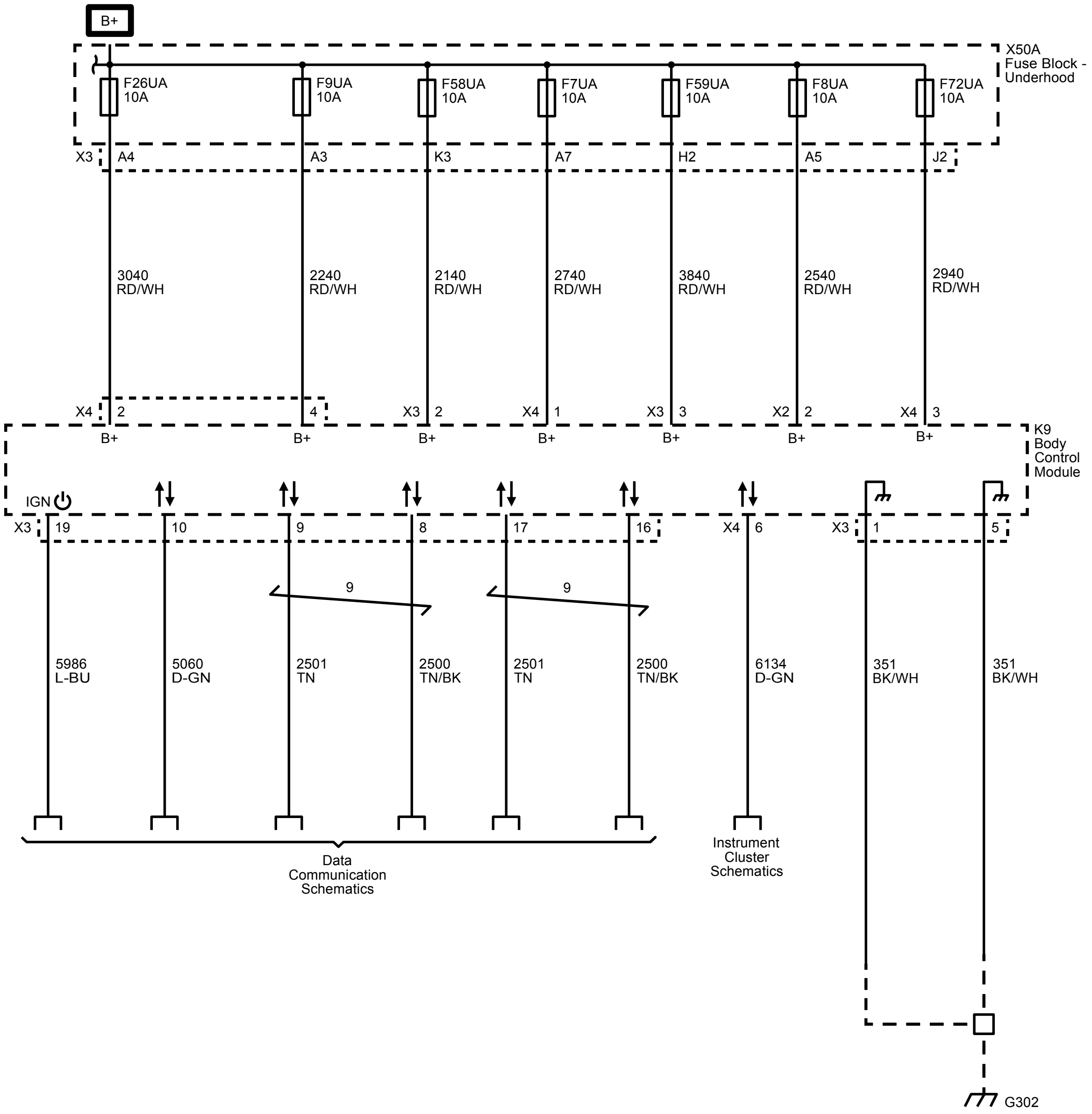
5986
L-BU
X101
D1
L20/L96/LC8
LGH
-K08
K08
5986
L-BU
5986
L-BU
J119
5986
L-BU
5986
L-BU
5986
L-BU
12 (JL4)
19 (-JL4)
19
IGN
K17
Electronic
Brake
Control
Module
J
IGN
E19
Coolant
Heater

BCM Power, Ground and Serial Data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X50A
Fuse Block - Underhood
F26UA 10A
F9UA 10A
F58UA 10A
F7UA 10A
F59UA 10A
F8UA 10A
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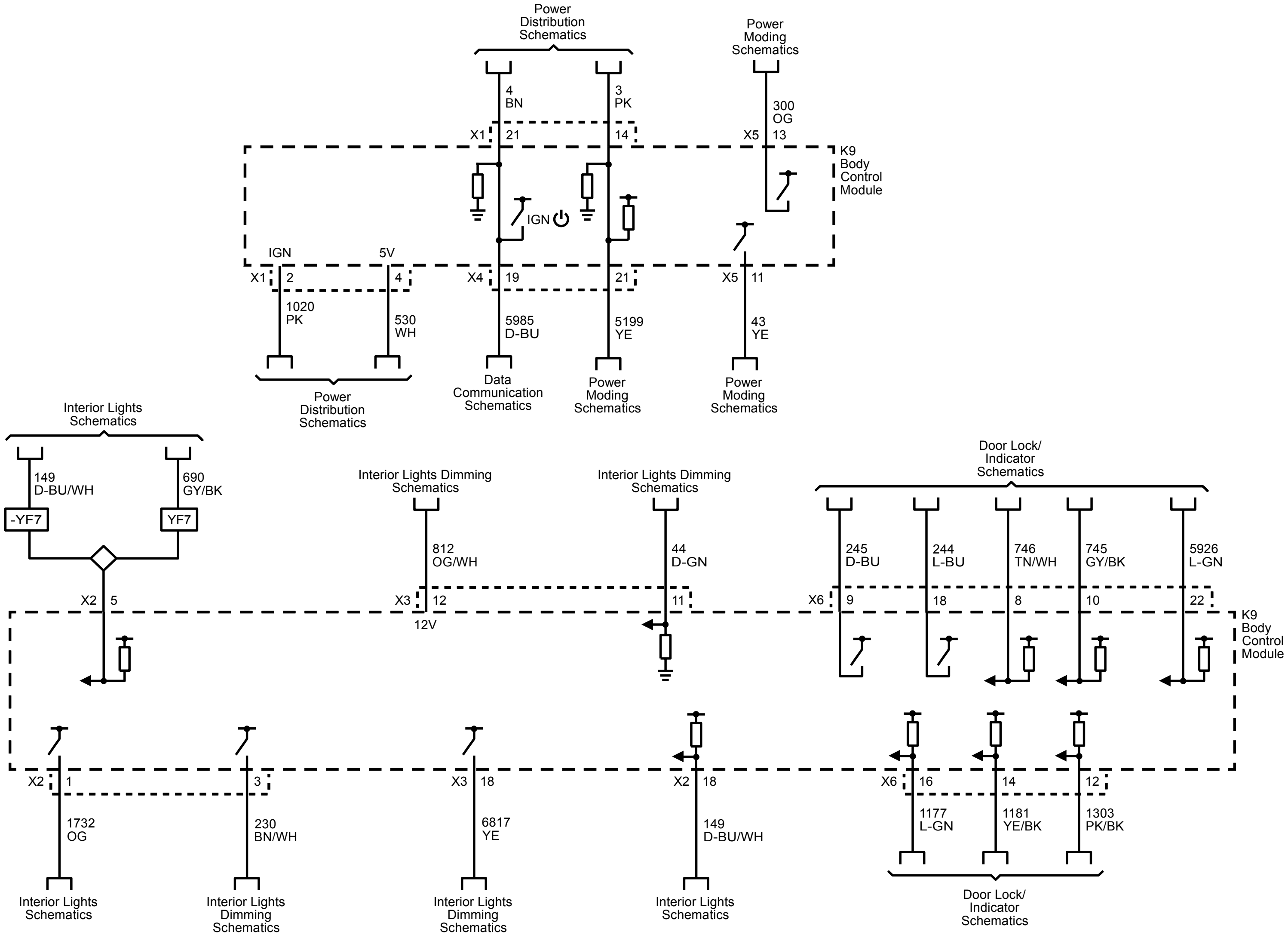
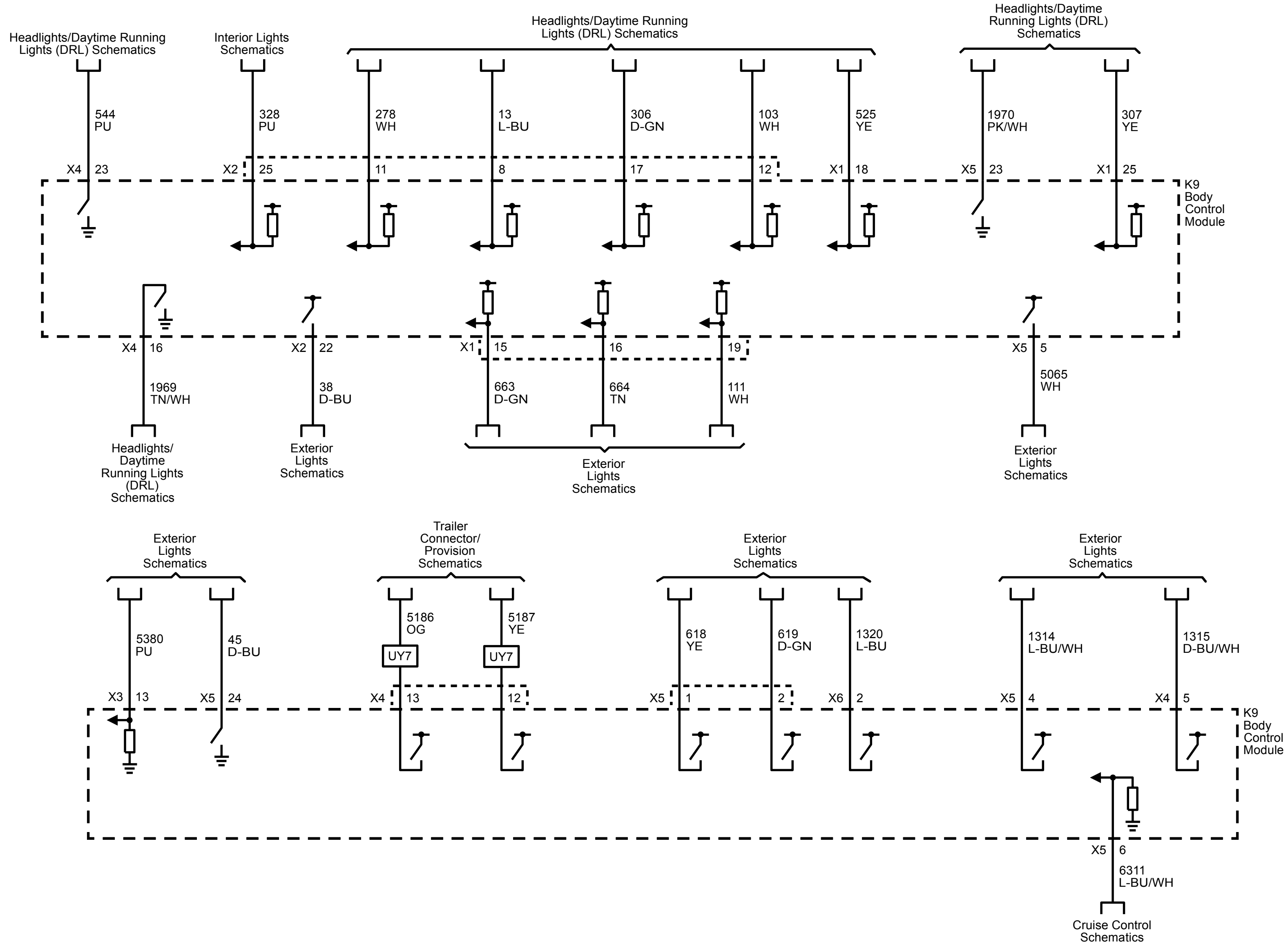
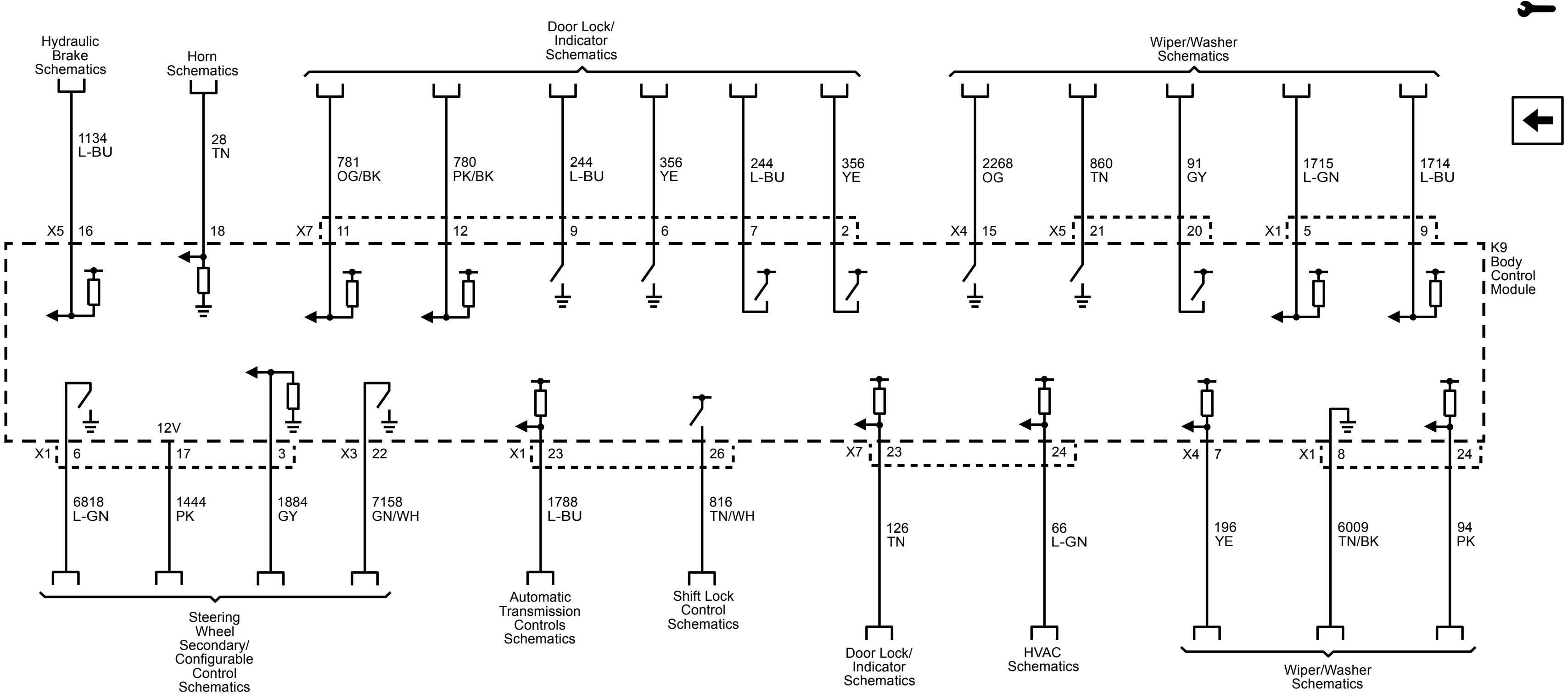
X3
A4
A3
K3
A7
H2
A5
J2
3040 RD/WH
2240 RD/WH
2140 RD/WH
2740 RD/WH
3840 RD/WH
2540 RD/WH
2940 RD/WH
X4 2
4
X3 2
X4 1
X3 3
X2 2
X4 3
B+
K9
Body Control Module
IGN
X3 19
10
9
8
17
16
X4 6
X3 1
5
9
9
5986 L-BU
5060 D-GN
2501 TN
2500 TN/BK
2501 TN
2500 TN/BK
6134 D-GN
351 BK/WH
351 BK/WH
Data Communication Schematics
Instrument Cluster Schematics
G302


Power Distribution Schematics
Power Moding Schematics
4 BN
3 PK
300 OG
X1 21
14
X5 13
K9 Body Control Module
IGN
IGN
5V
X1 2
4
X4 19
21
X5 11
1020 PK
530 WH
5985 D-BU
5199 YE
43 YE
Power Distribution Schematics
Data Communication Schematics
Power Moding Schematics
Power Moding Schematics
Interior Lights Schematics
149 D-BU/WH
690 GY/BK
-YF7
YF7
Interior Lights Dimming Schematics
812 OG/WH
Interior Lights Dimming Schematics
44 D-GN
Door Lock/ Indicator Schematics
245 D-BU
244 L-BU
746 TN/WH
745 GY/BK
5926 L-GN
X2 5
X3 12
12V
11
X6 9
18
8
10
22
K9 Body Control Module
X2 1
3
X3 18
X2 18
X6 16
14
12
1732 OG
230 BN/WH
6817 YE
149 D-BU/WH
1177 L-GN
1181 YE/BK
1303 PK/BK
Interior Lights Schematics
Interior Lights Dimming Schematics
Interior Lights Dimming Schematics
Interior Lights Schematics
Door Lock/ Indicator Schematics

BCM Inputs and Outputs (2 of 3)


Headlights/Daytime Running Lights (DRL) Schematics
Interior Lights Schematics
Headlights/Daytime Running Lights (DRL) Schematics
Headlights/Daytime Running Lights (DRL) Schematics
544 PU
328 PU
278 WH
13 L-BU
306 D-GN
103 WH
525 YE
1970 PK/WH
307 YE
X4 23
X2 25
11
8
17
12
X1 18
X5 23
X1 25
K9 Body Control Module
X4 16
X2 22
X1 15
16
19
X5 5
1969 TN/WH
38 D-BU
663 D-GN
664 TN
111 WH
5065 WH
Headlights/ Daytime Running Lights (DRL) Schematics
Exterior Lights Schematics
Exterior Lights Schematics
Exterior Lights Schematics
Exterior Lights Schematics
Trailer Connector/ Provision Schematics
Exterior Lights Schematics
Exterior Lights Schematics
5380 PU
45 D-BU
5186 OG
5187 YE
UY7
UY7
618 YE
619 D-GN
1320 L-BU
1314 L-BU/WH
1315 D-BU/WH
X3 13
X5 24
X4 13
12
X5 1
2
X6 2
X5 4
X4 5
K9 Body Control Module
X5 6
6311 L-BU/WH
Cruise Control Schematics

BCM Inputs and Outputs (3 of 3)


Hydraulic Brake Schematics
Horn Schematics
Door Lock/ Indicator Schematics
Wiper/Washer Schematics
1134 L-BU
28 TN
781 OG/BK
780 PK/BK
244 L-BU
356 YE
244 L-BU
356 YE
2268 OG
860 TN
91 GY
1715 L-GN
1714 L-BU
X5 16
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X7 11
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X4 15
X5 21
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X1 5
9
K9 Body Control Module
12V
X1 6
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X3 22
X1 23
26
X7 23
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X4 7
X1 8
24
6818 L-GN
1444 PK
1884 GY
7158 GN/WH
1788 L-BU
816 TN/WH
126 TN
66 L-GN
196 YE
6009 TN/BK
94 PK
Steering Wheel Secondary/ Configurable Control Schematics
Automatic Transmission Controls Schematics
Shift Lock Control Schematics
Door Lock/ Indicator Schematics
HVAC Schematics
Wiper/Washer Schematics

Description and Operation

Body Control System Description and Operation

The body control system consists of the body control module (BCM), communications, and various input and outputs. Some inputs, outputs and messages require other modules to interact with the BCM. The BCM also has discrete input and output terminals to control the vehicle's body functions. The BCM is wired to the GMLAN High speed serial data bus and the GMLAN Low speed serial data bus and acts as a gateway between them. If the BCM does not communicate the vehicle will not start due to the inability of the Engine/Powertrain Control Module (ECM/PCM) and Vehicle Theft Deterrent (VTD) Control Module to communicate without the BCM providing the gateway function.

Power Mode Master

This vehicles BCM functions as the power mode master (PMM). The ignition switch is a low current switch with multiple discrete ignition switch signals to the PMM for determination the power mode that will be sent over the serial data circuits to the other modules that need this information, and so the PMM will activate relays and other direct outputs of the PMM as needed. Refer to Power Mode Description and Operation for a complete description of power mode functions.

Serial Data Gateway

The BCM in this vehicle functions as a gateway or translator. The purpose of the gateway is to translate serial data messages between the GMLAN high speed bus and the GMLAN low speed bus for communication between the various modules. The gateway will interact with each network according to that network's transmission protocol.

One example of this necessary communication is the communication between the Engine/Powertrain Control Module (ECM/PCM) which is high speed serial data and Vehicle Theft Deterrent (VTD) Control Module which is low speed serial data. If these modules can not exchange information, the vehicle will not start.

Communication between the BCM and a scan tool can be on the high speed GMLAN network or low speed GMLAN network. If one network is lost, the BCM can still communicate with the scan tool. A lost communication DTC typically is set in modules other than the module with a communication failure.

Body Control Module

The various body control module (BCM) input and output circuits are described in the corresponding functional areas indicated on the BCM electrical schematics. Some BCM functions with the subsystems may be as a gateway only or as an enable for the system. The BCM related systems/subsystems include, but are not limited to the following:

- Antilock brake system (ABS)—Refer to ABS Description and Operation.
- Cruise control system—Refer to Cruise Control Description and Operation.
- Exterior lighting—Refer to Exterior Lighting Systems Description and Operation.
- Horn system —Refer to Horns System Description and Operation.
- Instrument cluster indicator control—Refer to Instrument Cluster Description and Operation.
- Interior lighting—Refer to Interior Lighting Systems Description and Operation.
- Power door lock system —Refer to Power Door Locks Description and Operation.
- Rear window defogger system —Refer to Rear Window Defogger Description and Operation.
- Remote function actuation (RFA) control—Refer to Keyless Entry System Description and Operation.
- Retained accessory power (RAP)—Refer to Retained Accessory Power Description and Operation.
- Shift lock control system —Refer to Automatic Transmission Shift Lock Control Description and Operation.
- Starting system—Refer to Starting System Description and Operation.
- Supplemental inflatable restraint (SIR) system —Refer to Supplemental Inflatable Restraint System Description and Operation.
- Theft deterrent—Refer to Immobilizer Description and Operation.
- Wiper/Washer system functions—Refer to Wiper/Washer System Description and Operation (Wiper and Washers).

Data Link Communications Description and Operation

Circuit Description

The communication among control modules is performed primarily through the GMLAN high speed serial data circuit and the GMLAN low speed serial data circuits. The modules that need real time communication are attached to the high speed GMLAN network. The body control module (BCM) is the serial data gateway between the networks. The purpose of the gateway is to translate serial data messages between the GMLAN high speed bus and the GMLAN low speed bus. The Local Interconnect Network (LIN) is another serial data communication network used on this vehicle which is dedicated to the remote compass module (RCM) subsystem. Below are more detailed descriptions of the individual networks. The gateway will interact with each network according to that network's transmission protocol. Refer to Body Control System Description and Operation for more information about the gateway.

GMLAN High Speed Circuit Description

The data link connector (DLC) allows a scan tool to communicate with the high speed GMLAN serial data circuit. The serial data is transmitted on two twisted wires that allow speed up to 500 Kb/s. The twisted pair is terminated with two 120 ohms resistors. The resistors are used to reduce noise on the High Speed GMLAN bus during normal vehicle operation. The high speed GMLAN is a differential bus. The high speed GMLAN serial data (+) and high speed GMLAN serial data (−) are driven to opposite extremes from a rest or idle level. The idle level, which is approximately 2.5 volts, is considered recessive transmitted data and is interpreted as a logic 1. Driving the lines to their extremes, adds one volt to the high speed GMLAN serial data (+) and subtracts one volt from the high speed GMLAN serial data (−) wire. This dominant state is interpreted as a logic 0. GMLAN network management supports selective start up and is based on virtual networks. A virtual network is a collection of signals started in response to a vehicle event. The starting of a virtual network signifies that a particular aspect of the vehicles functionality has been requested. A virtual network is supported by virtual devices, which represents a collection of signals owned by a single physical device. So, any physical device can have one or more virtual devices. The signal supervision is the process of determining whether an expected signal is being received or not. Failsofting is the ability to substitute a signal with a default value or a default algorithm, in the absence of a valid signal. Some messages are also interpreted as a heartbeat of a virtual device. If such a signal is lost, the application will set a no communication code against the respective virtual device. This code is displayed on the Tech 2 screen as a code against the physical device. Note: a loss of serial data DTC does not represent a failure of the module that the code is set in.

GMLAN Low Speed Circuit Description

The data link connector (DLC) allows a scan tool to communicate with the low speed GMLAN serial data circuit. The serial data is transmitted over a single wire to the appropriate control modules. The transmission speed for GMLAN low speed is up to 83.33 Kb/s. Under normal vehicle operating conditions, the speed of the bus is 33.33 Kb/s. This protocol produces a simple pulse train sent out over the GMLAN low speed serial data bus. When a module pulls the bus high, 5 volts, this creates a dominant logic state or 0 on the bus. When the bus is pulled low, 0 volts, it is translated as a recessive logic state or 1. To wake the control modules connected to the GMLAN low speed serial data bus, a high voltage wake up pulse is sent out over the bus, the voltage level of the pules is +10 volts. Modules connected to the GMLAN low speed bus can be part of a virtual network as described in the previous paragraph. Most modules on the GMLAN low speed serial data bus are connected to the bus in a parallel configuration. Refer to the schematics to determine modules that are not in parallel

Local Interconnect Network (LIN) Description

The remote compass module (RCM) communicates with the BCM utilizing a single wire LIN communication link. The BCM is the gateway for the GMLAN network. All data is communicated on the LIN bus, therefore there are only 3 circuits to the RCM as follows:

- Ground
- LIN bus
- Voltage

Data Link Connector (DLC)

The data link connector (DLC) is a standardized 16-cavity connector. Connector design and location is dictated by an industry wide standard, and provides the following:

- Pin 1 GMLAN low speed communications terminal
- Pin 4 Scan tool power ground terminal
- Pin 5 Common signal ground terminal
- Pin 6 High speed GMLAN serial data bus (+) terminal
- Pin 14 High speed GMLAN serial data bus (−) terminal
- Pin 16 Scan tool power, battery positive voltage terminal

Serial Data Reference

The scan tool communicates over the various busses on the vehicle. When a scan tool is installed on a vehicle, the scan tool will try to communicate with every module that could be optioned into the vehicle. If an option is not installed on the vehicle, the scan tool will display No Comm for that options specific control module. In order to avert misdiagnoses of No Communication with a specific module, refer to CELL Link Error - Link target cell (cell ID 148085) is invalid for this publication. for a list of modules, the bus they communicate with, and the RPO codes for a specific module.

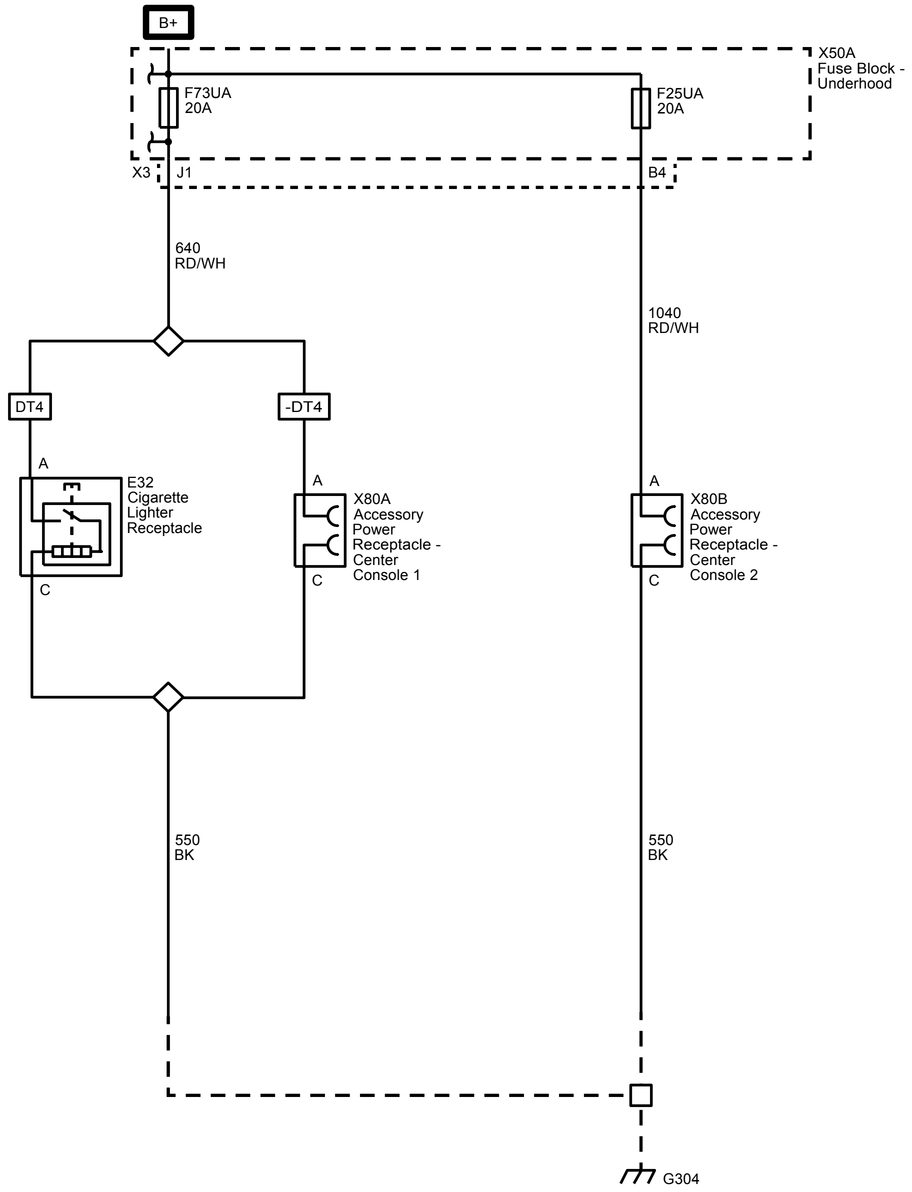
Power and Signal Distribution

Power Outlets

Schematic and Routing Diagrams

Cigar Lighter/Power Outlet Schematics

Cigar Lighter/Power Outlet


B+
X50A
Fuse Block -
Underhood
F73UA
20A
F25UA
20A
X3
J1
B4
640
RD/WH
1040
RD/WH
DT4
-DT4
A
E32
Cigarette
Lighter
Receptacle
C
A
X80A
Accessory
Power
Receptacle -
Center
Console 1
C
A
X80B
Accessory
Power
Receptacle -
Center
Console 2
C
550
BK
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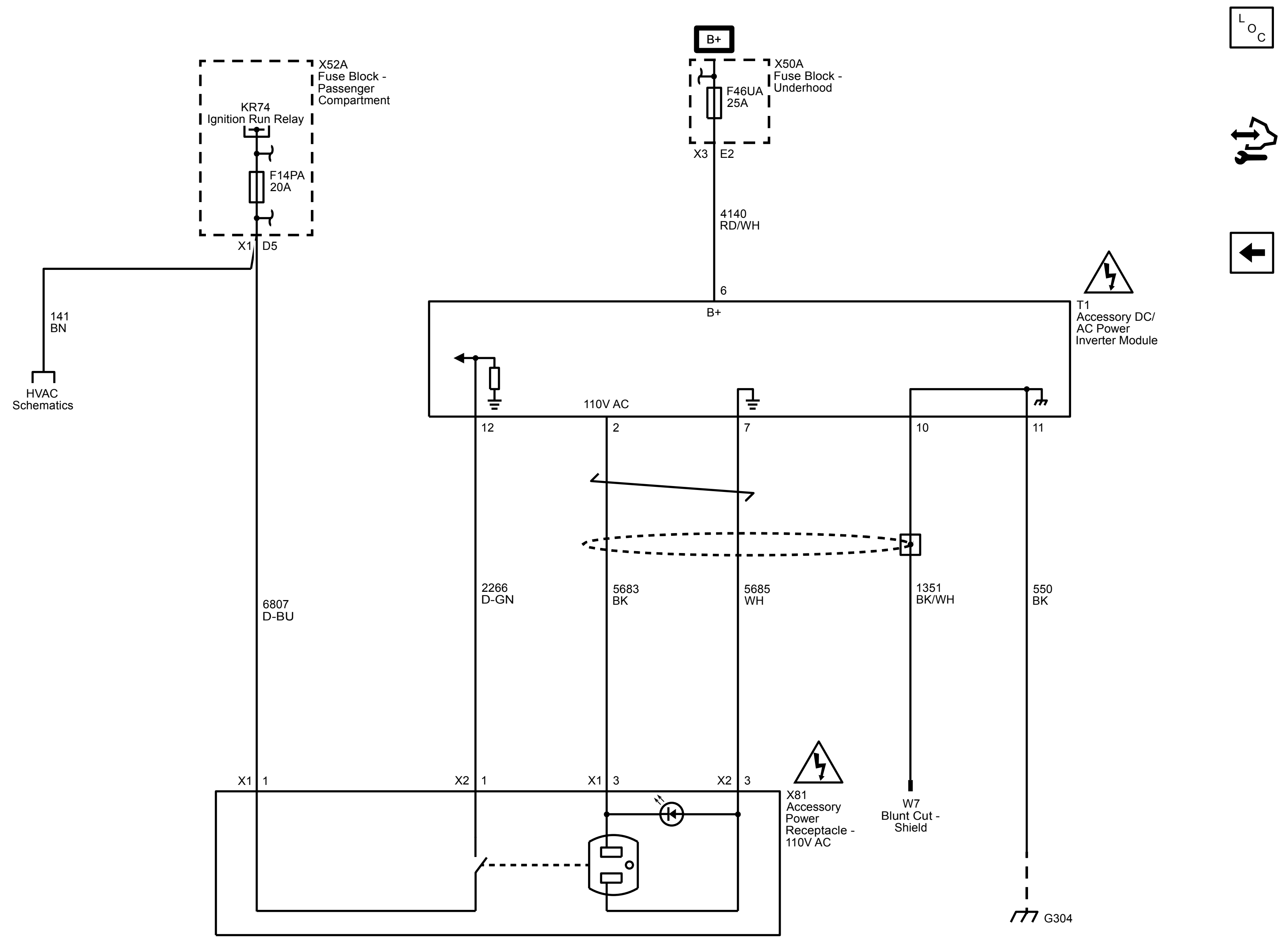
BK
G304

110V AC Outlet (KI4)


B+
X52A
Fuse Block -
Passenger
Compartment
KR74
Ignition Run Relay
F14PA
20A
X1
D5
141
BN
HVAC
Schematics
X50A
Fuse Block -
Underhood
F46UA
25A
X3
E2
4140
RD/WH
6
B+
T1
Accessory DC/
AC Power
Inverter Module
110V AC
12
2
7
10
11
6807
D-BU
2266
D-GN
5683
BK
5685
WH
1351
BK/WH
550
BK
X1 1
X2 1
X1 3
X2 3
X81
Accessory
Power
Receptacle -
110V AC
W7
Blunt Cut -
Shield
G304
L O C

Description and Operation

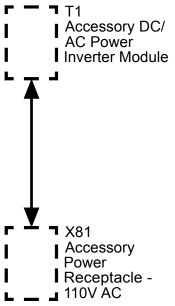
Power Outlets Description and Operation

12 Volt Power Outlet Receptacle Description and Operation

The 12 V accessory power receptacles are supplied B+ all the time.

110 Volt Power Outlet Receptacle System Description

Power Outlets Block Diagram


T1
Accessory DC/AC Power Inverter Module
X81
Accessory Power Receptacle - 110V AC

The alternating current (AC) accessory power outlet system consists of the accessory DC/AC power inverter module and the accessory power receptacle – 110 V AC. The accessory DC/AC power inverter module converts 12 V direct current (DC) battery power to 110 V at 60 Hertz (Hz) AC power to operate AC powered devices. The accessory DC/AC power inverter module provides up to 150 watts of power. The accessory power receptacle – 110 V AC provides the usual connection for AC powered devices.

110 Volt Power Outlet Receptacle System Operation

The accessory DC/AC power inverter module receives fuse protected battery voltage and is connected to the 12 V electrical system ground. The accessory power receptacle – 110 V AC has an internal switch, that detects when an AC powered device is plugged into the outlet. When the ignition is ON, and an AC powered device is plugged into the accessory power receptacle – 110 V AC, the normally open switch in the accessory power receptacle – 110 V AC, closes. When the accessory DC/AC power inverter module detects the voltage from the accessory power receptacle – 110 V AC switch, the inverter module begins to supply 110 V AC to the accessory power receptacle – 110 V AC after a 1.5 second delay. The accessory AC power system is protected against circuit overload and circuit shorts to ground.

110 Volt Power Outlet Receptacle Isolation Fault Protection

The accessory DC/AC power inverter module contains a ground fault circuit interrupter (GFCI). GFCI monitors the 110 V circuit for a short to vehicle chassis ground. If a 110 V AC short to ground is detected, the accessory DC/AC power inverter module will turn OFF. The module remains OFF, until the AC powered device is unplugged from the outlet, and then plugged into the outlet after a 3 second delay.

110 Volt Power Outlet Receptacle Overload Shutdown

The accessory DC/AC power inverter module will turn OFF if the current in the 110 V circuit is greater than 3.8 A for 1 second, or 2.5 A for 10 seconds. The module will turn ON again, when the AC powered device is unplugged from the outlet, and then plugged into the outlet after a 3 second delay.

110 Volt Power Outlet Receptacle Internal Shutdown

The accessory DC/AC power inverter module will turn OFF if the B+ supply voltage is greater than 16.5 V or less than 11 V. The module will also turn OFF if the device temperature is greater than 85°C (185°F). The module will turn ON again, after the shutdown condition is corrected, and the AC powered device is unplugged from the outlet, and then plugged into the outlet.

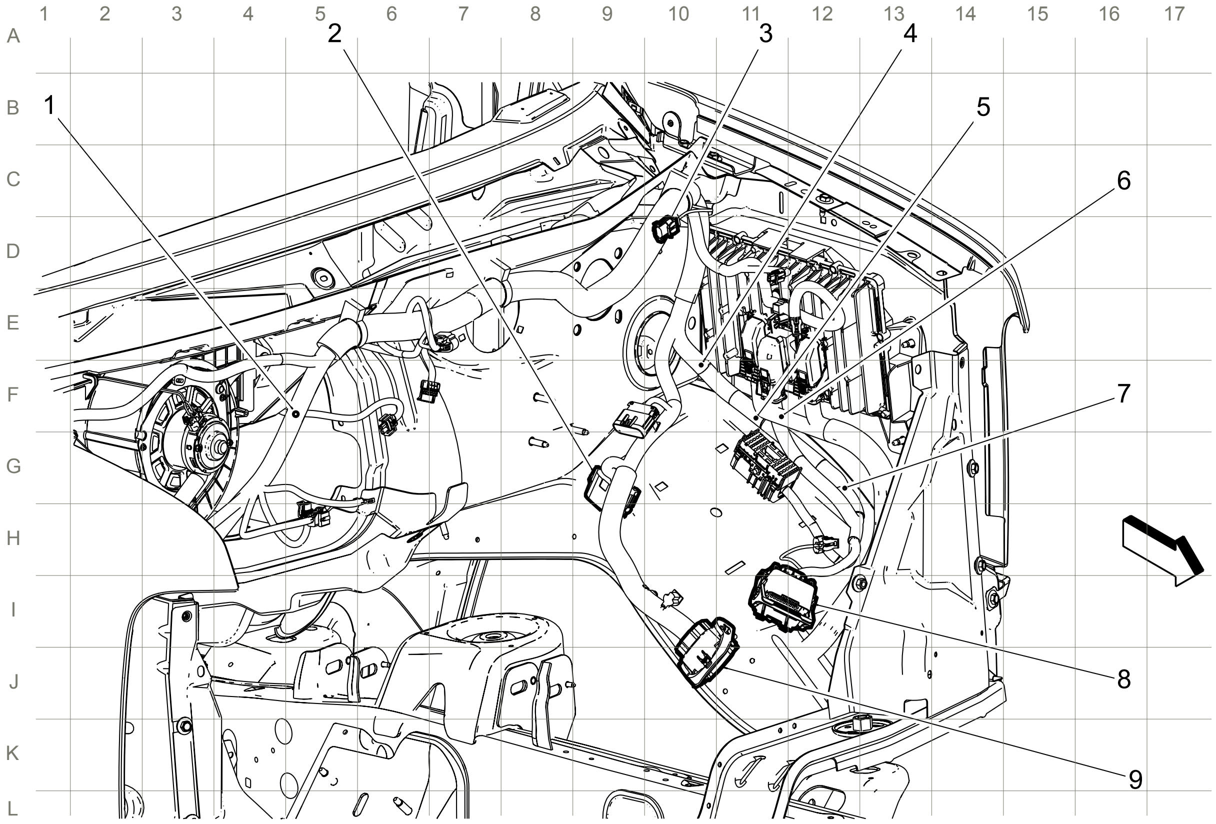
Power and Signal Distribution

Wiring Systems and Power Management

Schematic and Routing Diagrams

Harness Routing Views

Engine Harness Routing - Left Side of Engine Compartment (LGH)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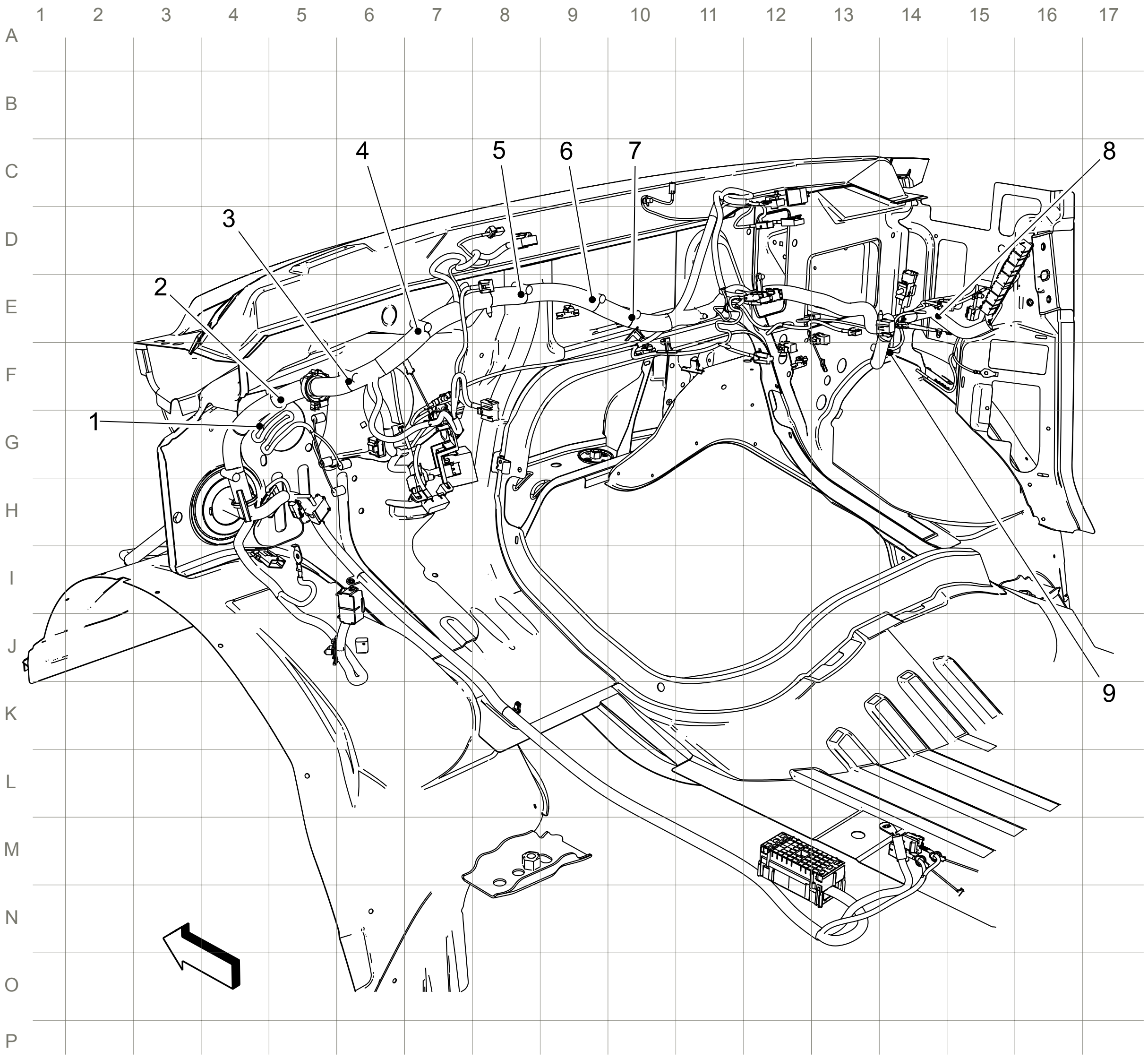
Items

1. J102
2. X101
3. X109
4. J123
5. J115
6. J161
7. J101
8. X107
9. X100

Instrument Panel Harness Routing - Dash Area (2 of 2)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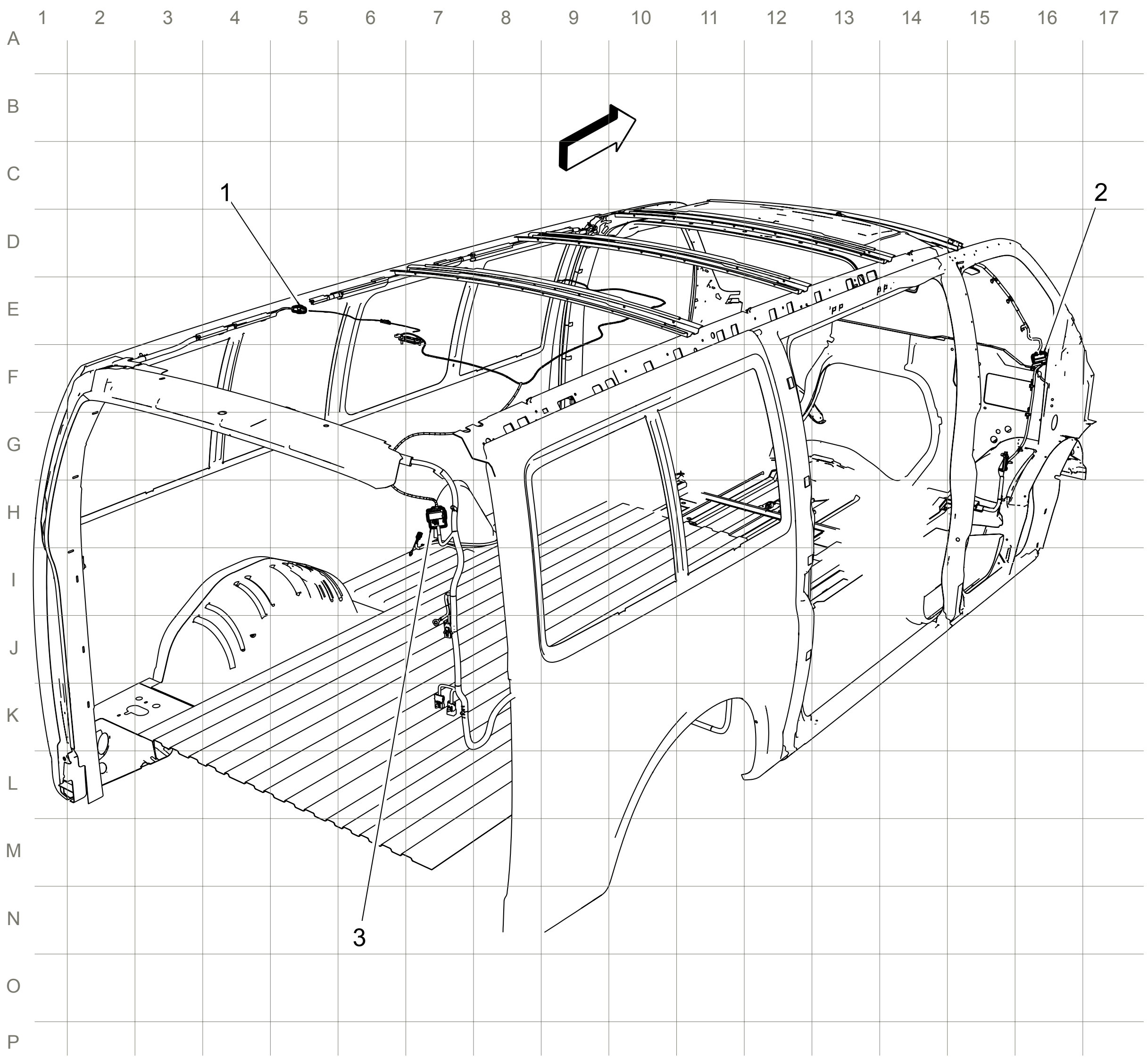
Items

1. J247
2. J244
3. J231
4. J248
5. J207
6. J246
7. J245
8. J249
9. J250

Body Harness Routing - Roof Area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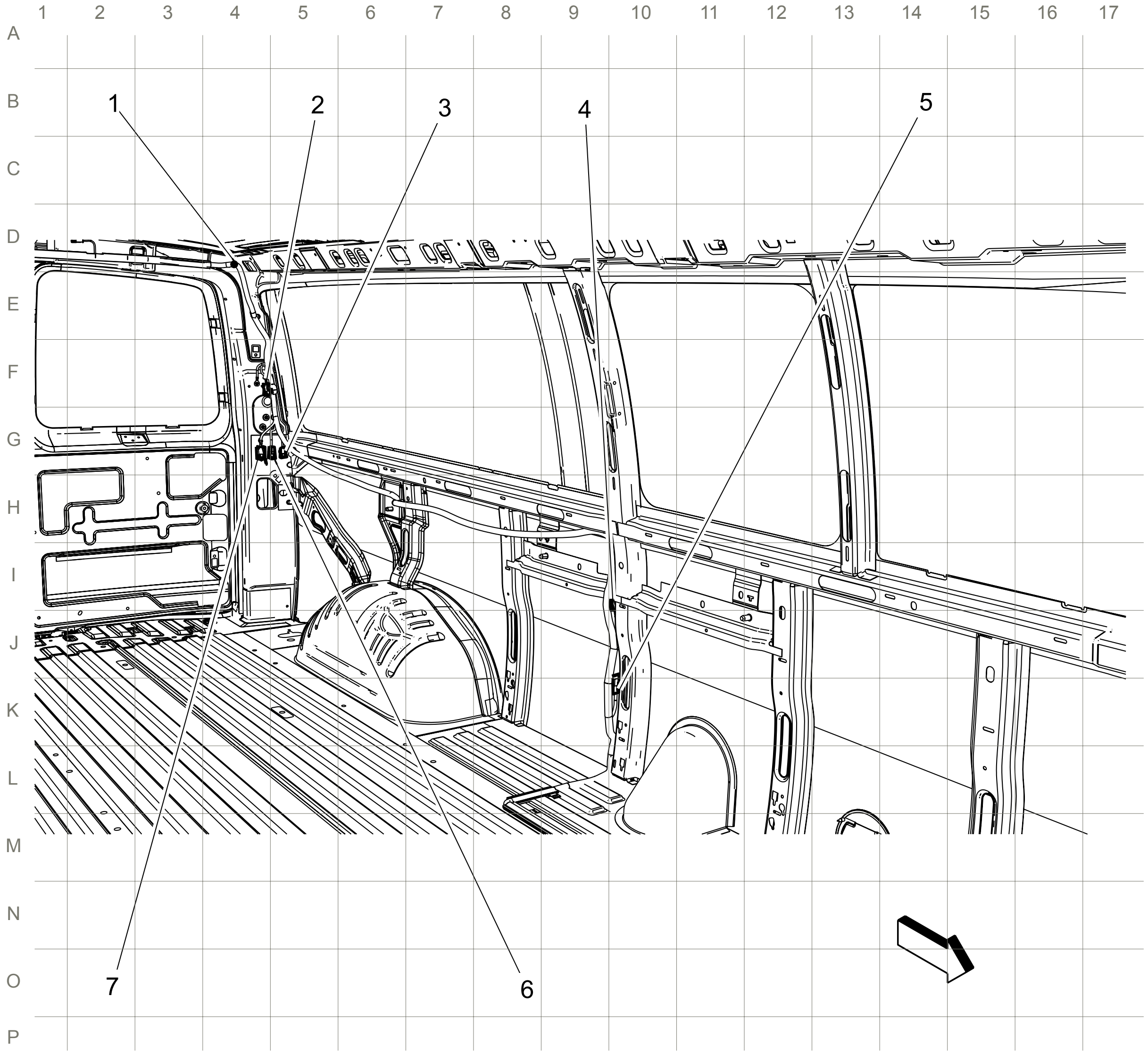
Items

1. X417
2. X205
3. X420

Body Harness Routing - Left Rear (Passenger or Cargo)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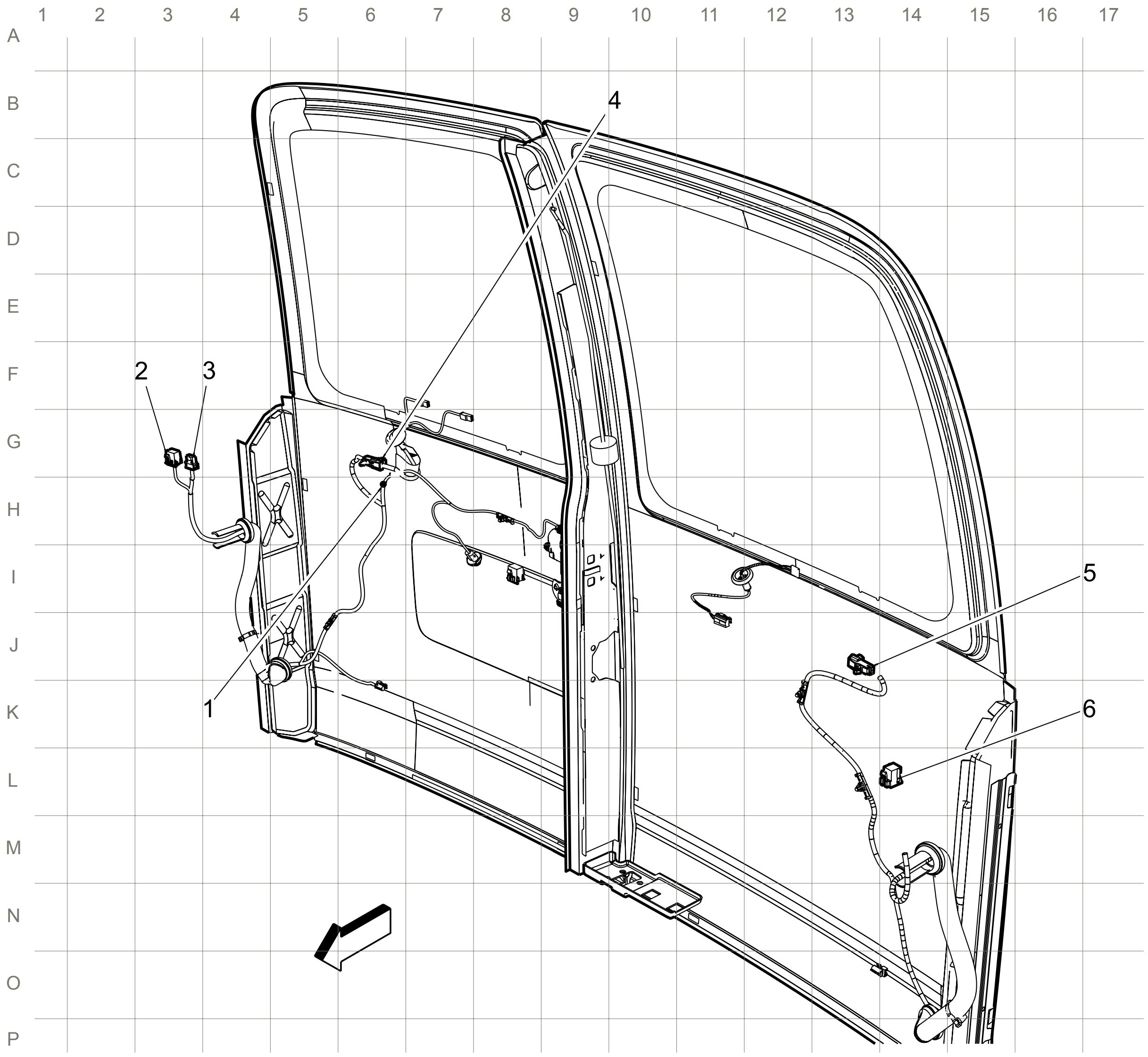
Items

1. J410
2. X401
3. X407
4. X222
5. X320
6. X409
7. X411

Rear Cargo Doors Harness Routing (Passenger or Cargo)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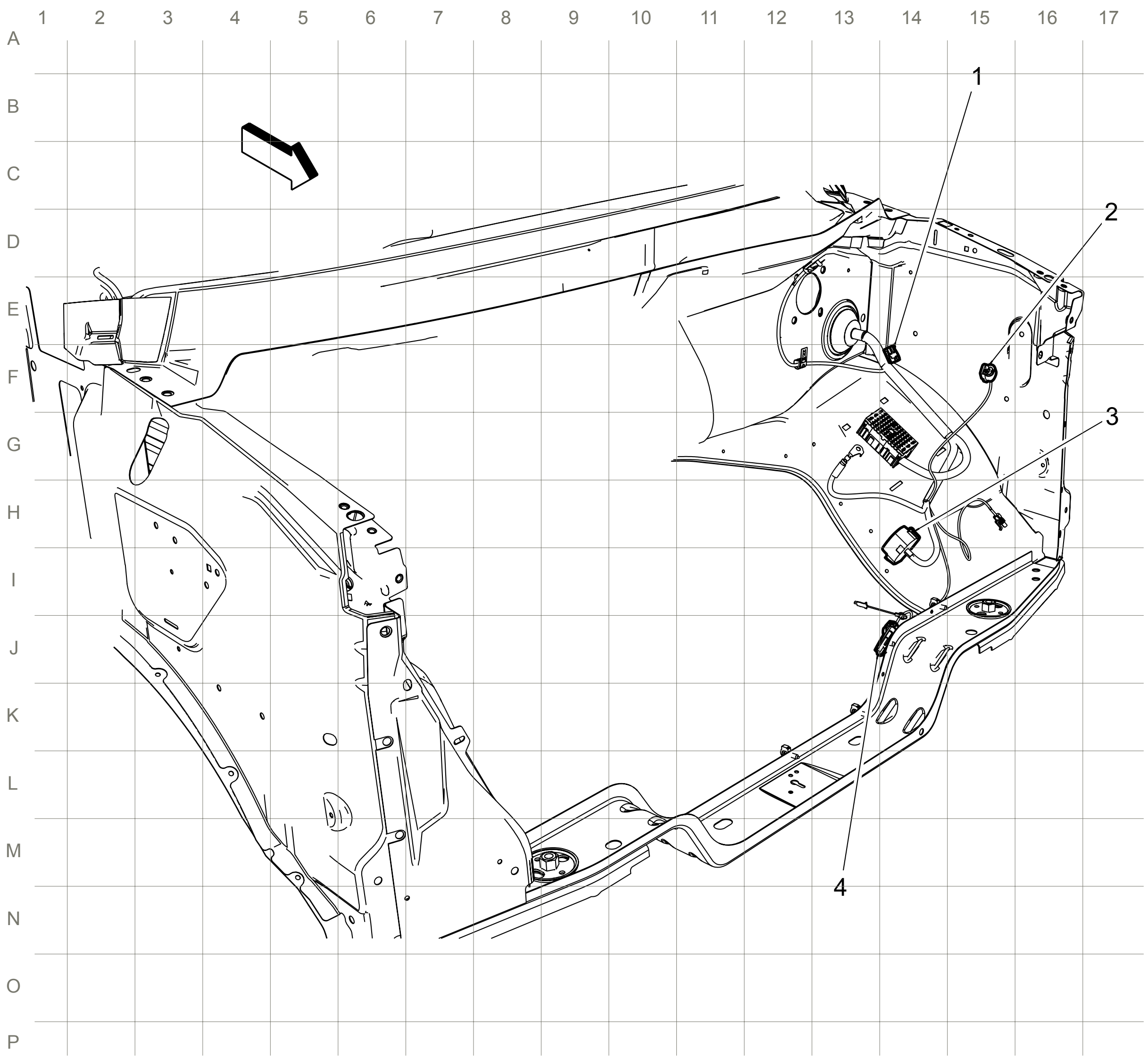
Items

1. J902
2. X400
3. X412
4. X902
5. X901
6. X411

Instrument Panel Harness Routing - Engine Compartment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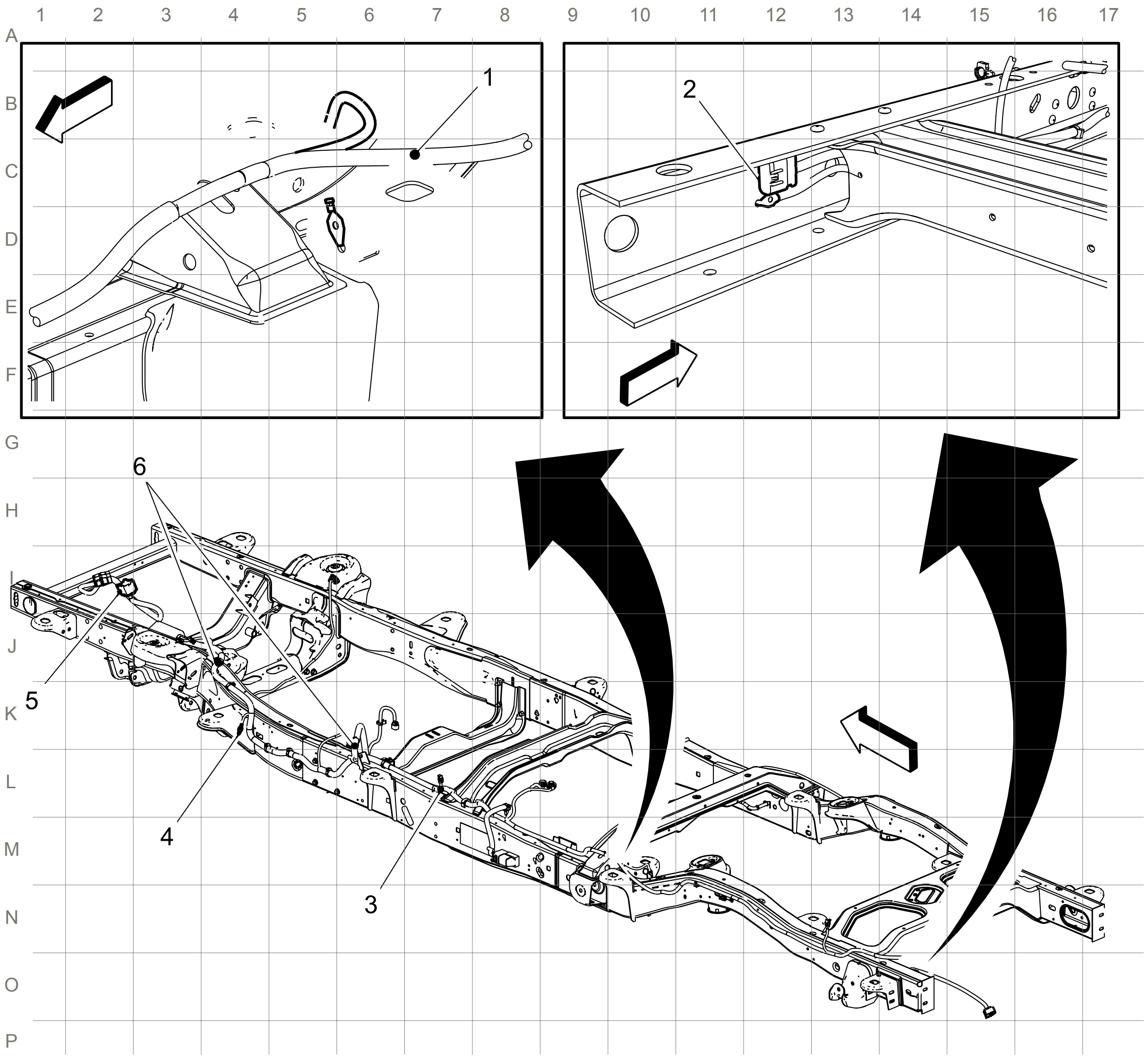
Items

1. X141
2. X150
3. X100
4. X104

Chassis Harness Routing (L20, L96, or LC8)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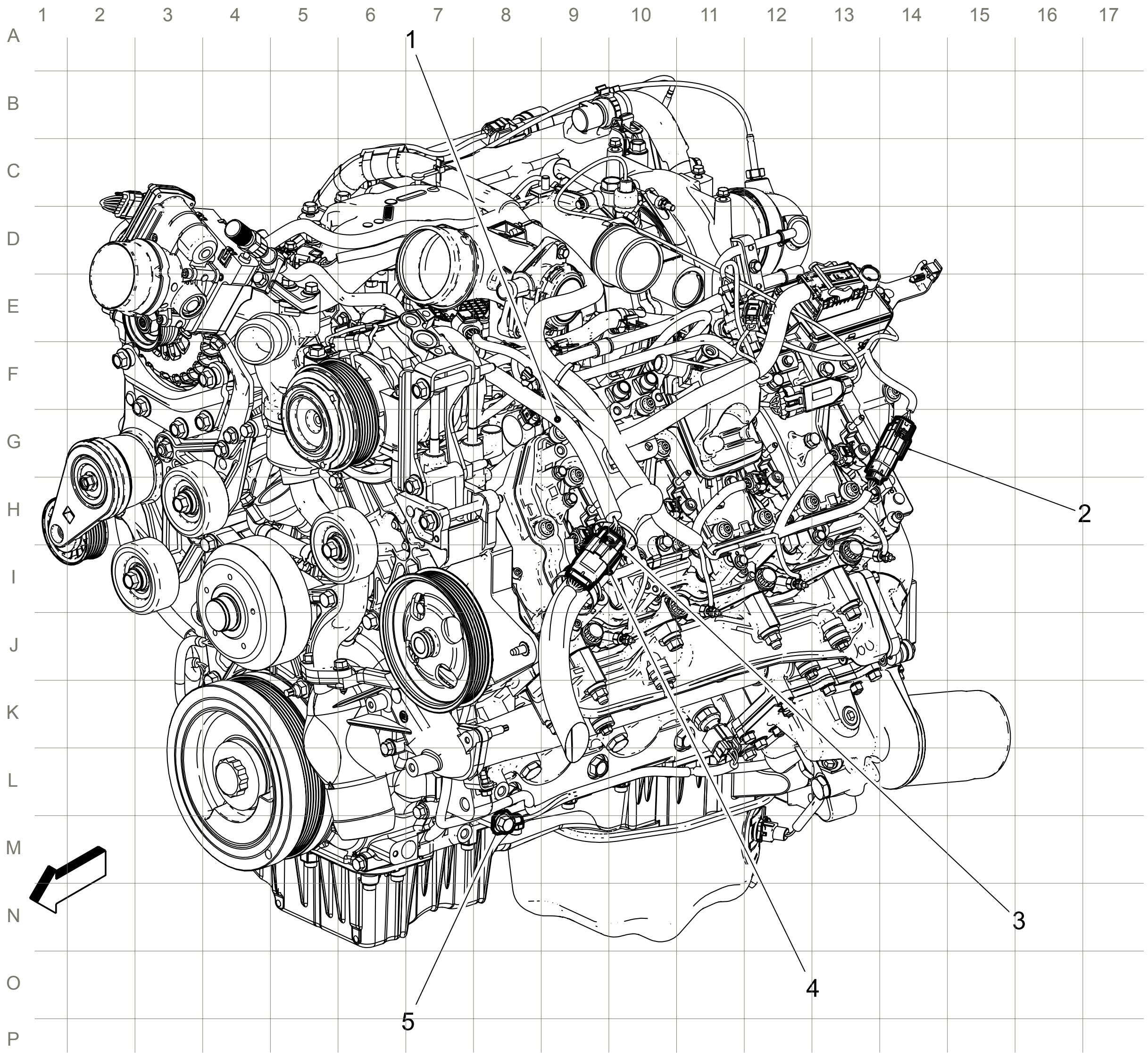
Items

1. J402
2. X405
3. J301
4. G300
5. X101
6. J315

Engine Harness Routing - Left Front of Engine (LGH)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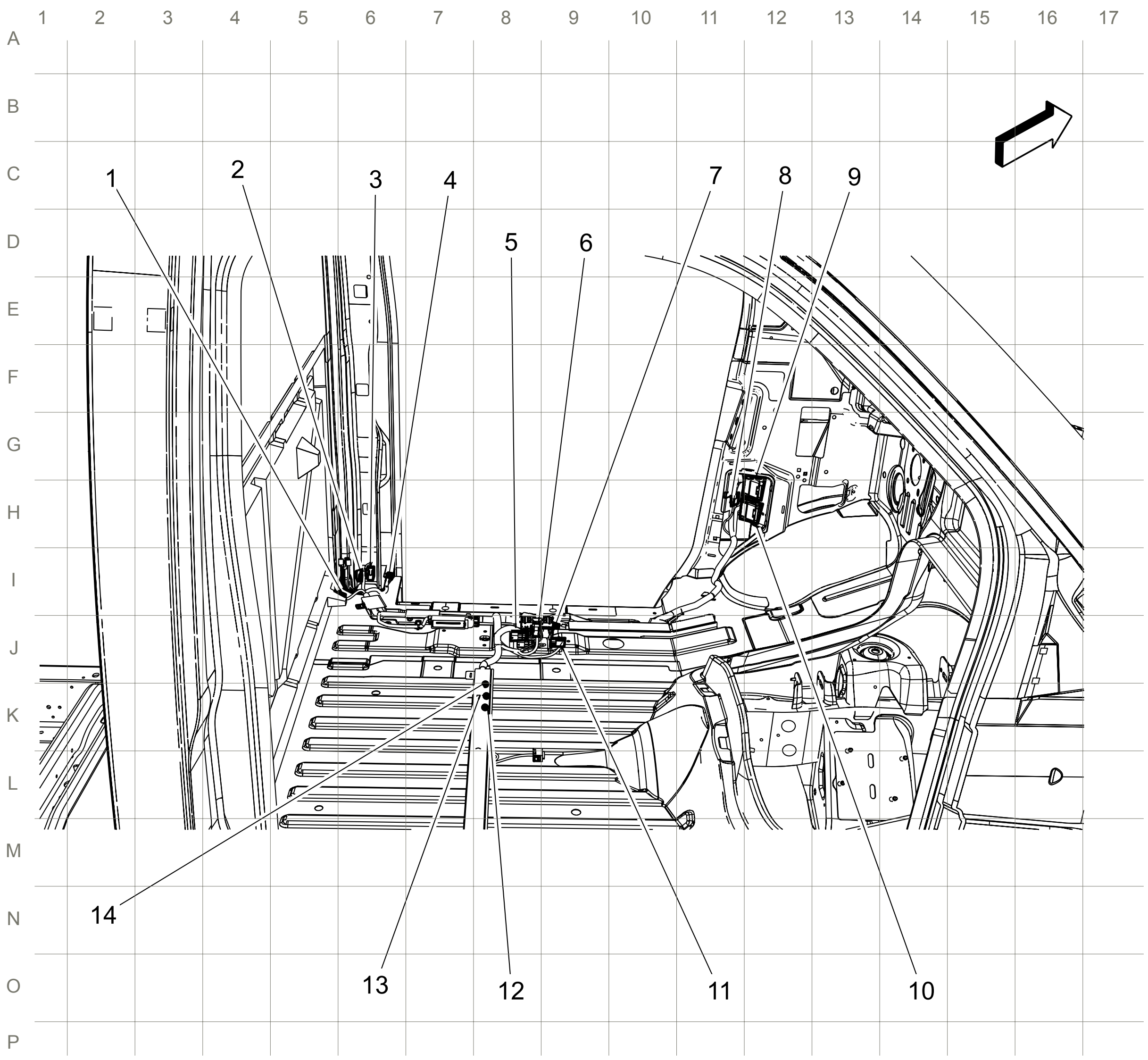
Items

1. J164
2. X112
3. X110
4. J160
5. G110

Body Harness Routing - Left Front of Passenger Compartment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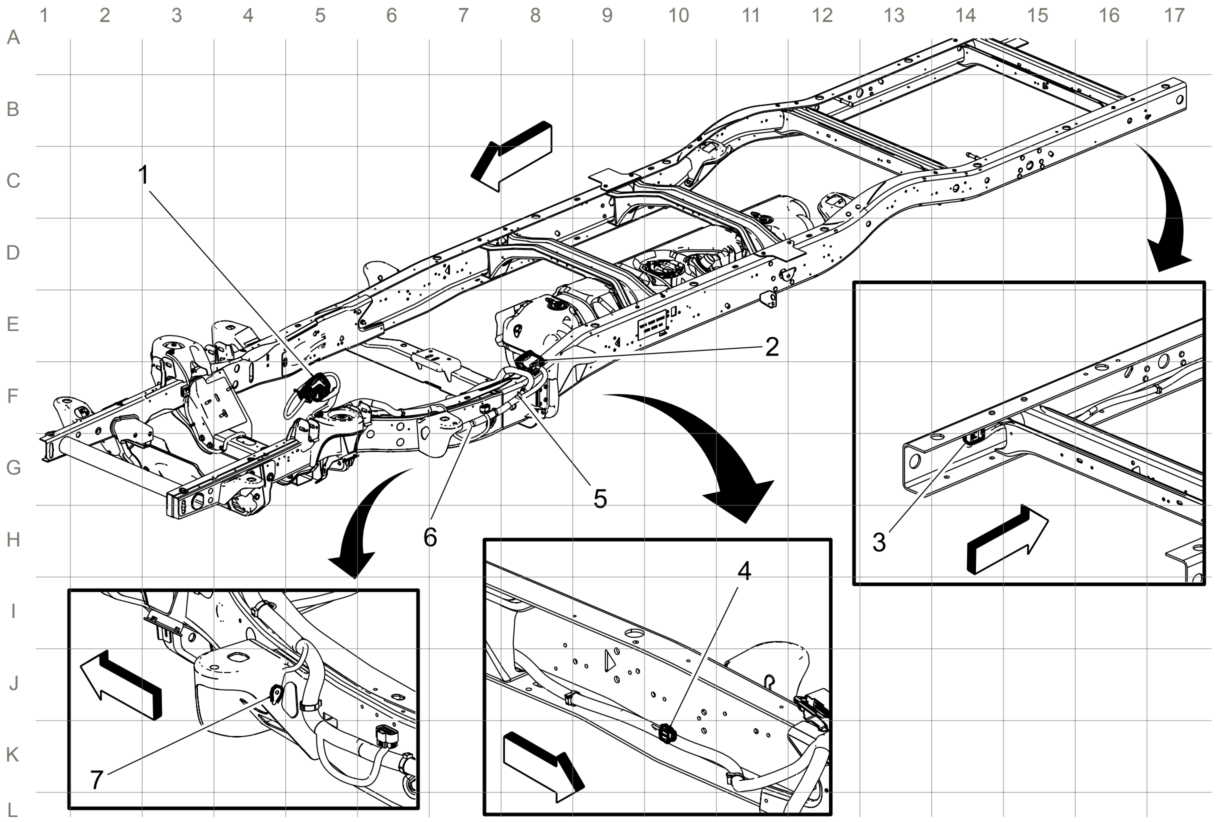
Items

1.	X403
2.	X409
3.	X407
4.	JX347
5.	X330
6.	X331
7.	J356
8.	X319
9.	X318
10.	X500
11.	X329

12. J371
13. J370
14. J372

Chassis Harness Routing (LGH)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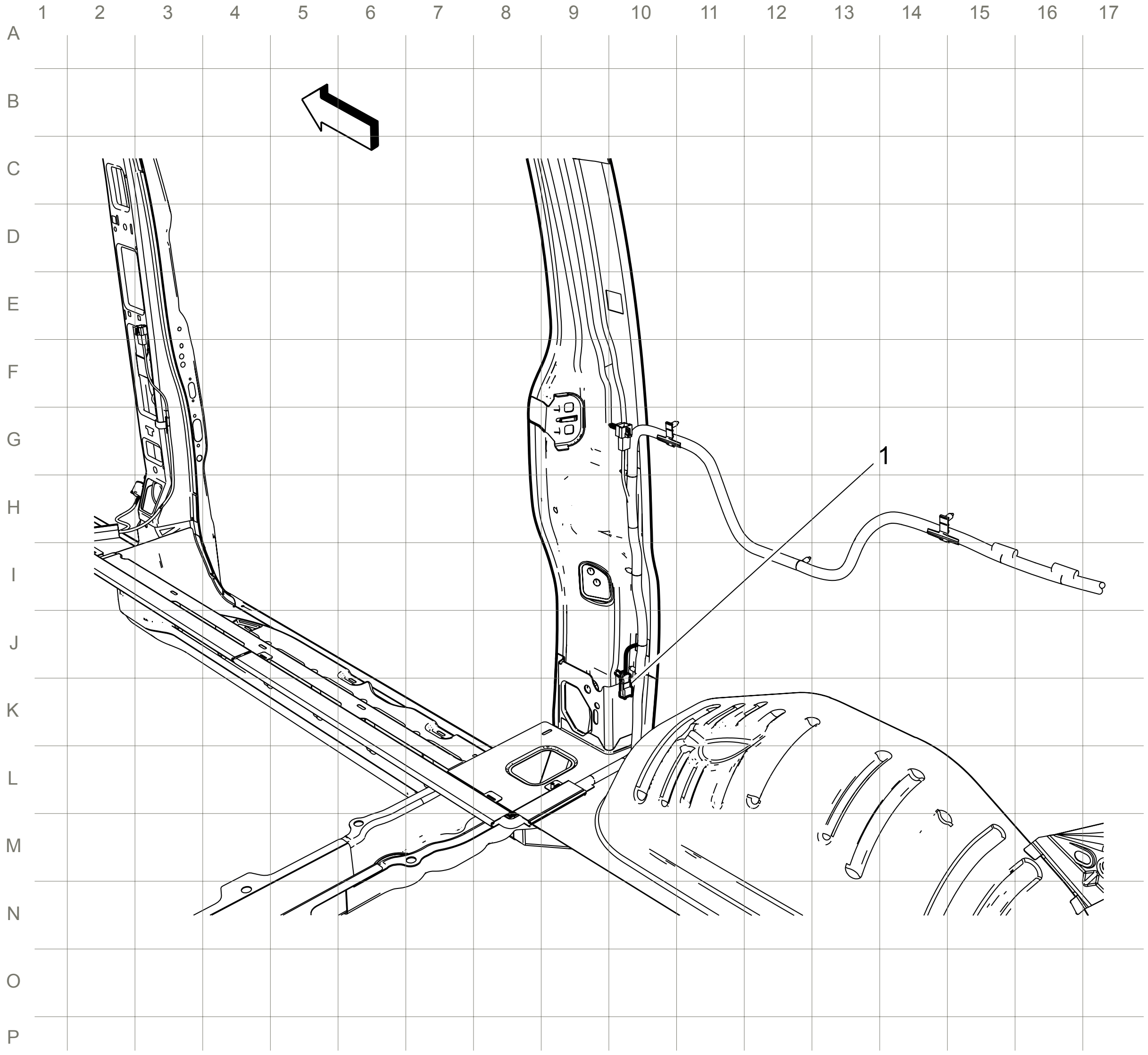
Items

1. X101
2. X395
3. X405
4. X305
5. J315
6. J119
7. G300

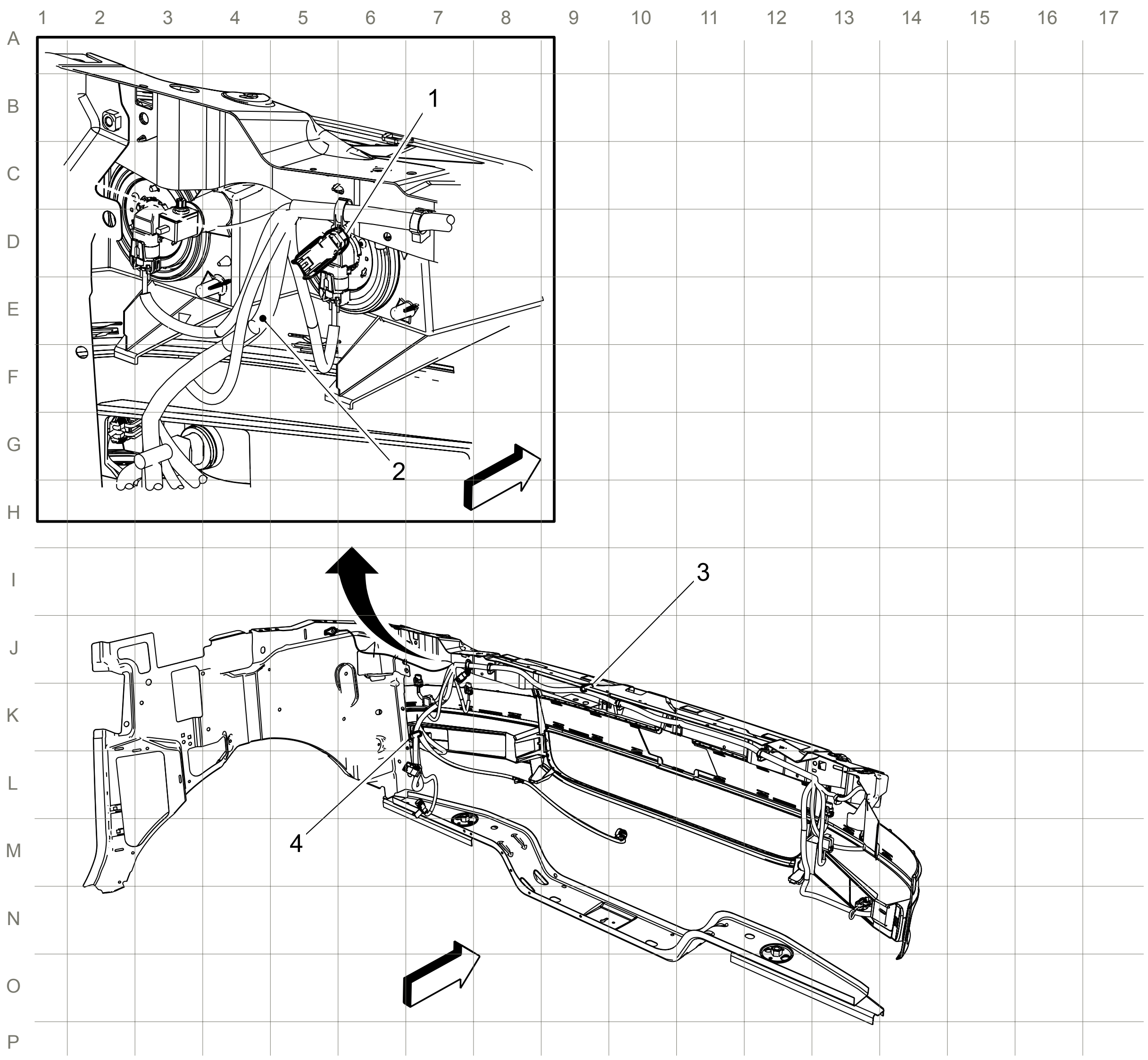
Body Harness Routing - Right C-Pillar


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
A B C D E F G H I J K L M N O P
1

Items

1. X324

Forward Lamp Harness Routing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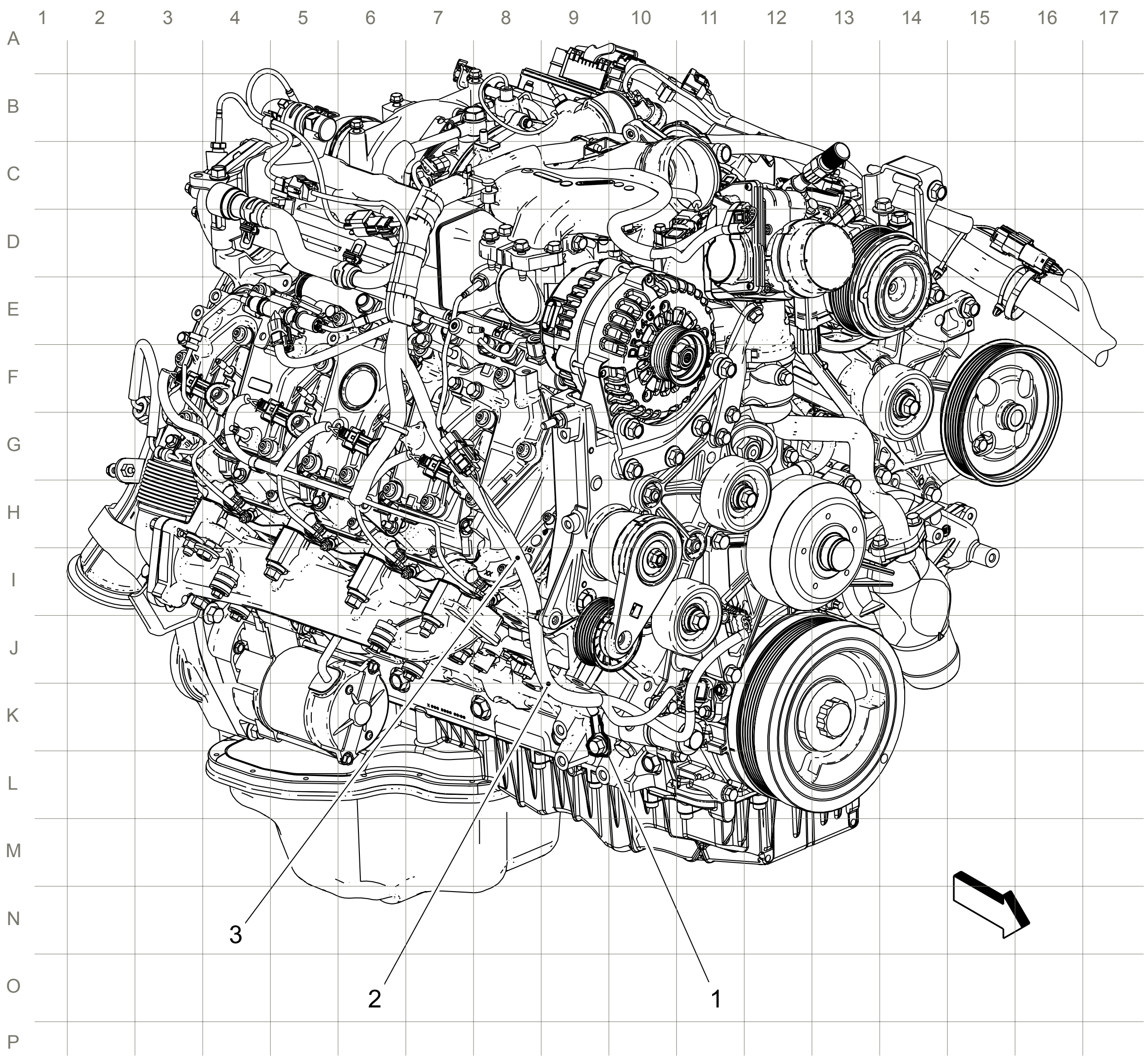
Items

1. X150
2. J110
3. J121
4. J122

Engine Harness Routing - Right Front of Engine (LGH)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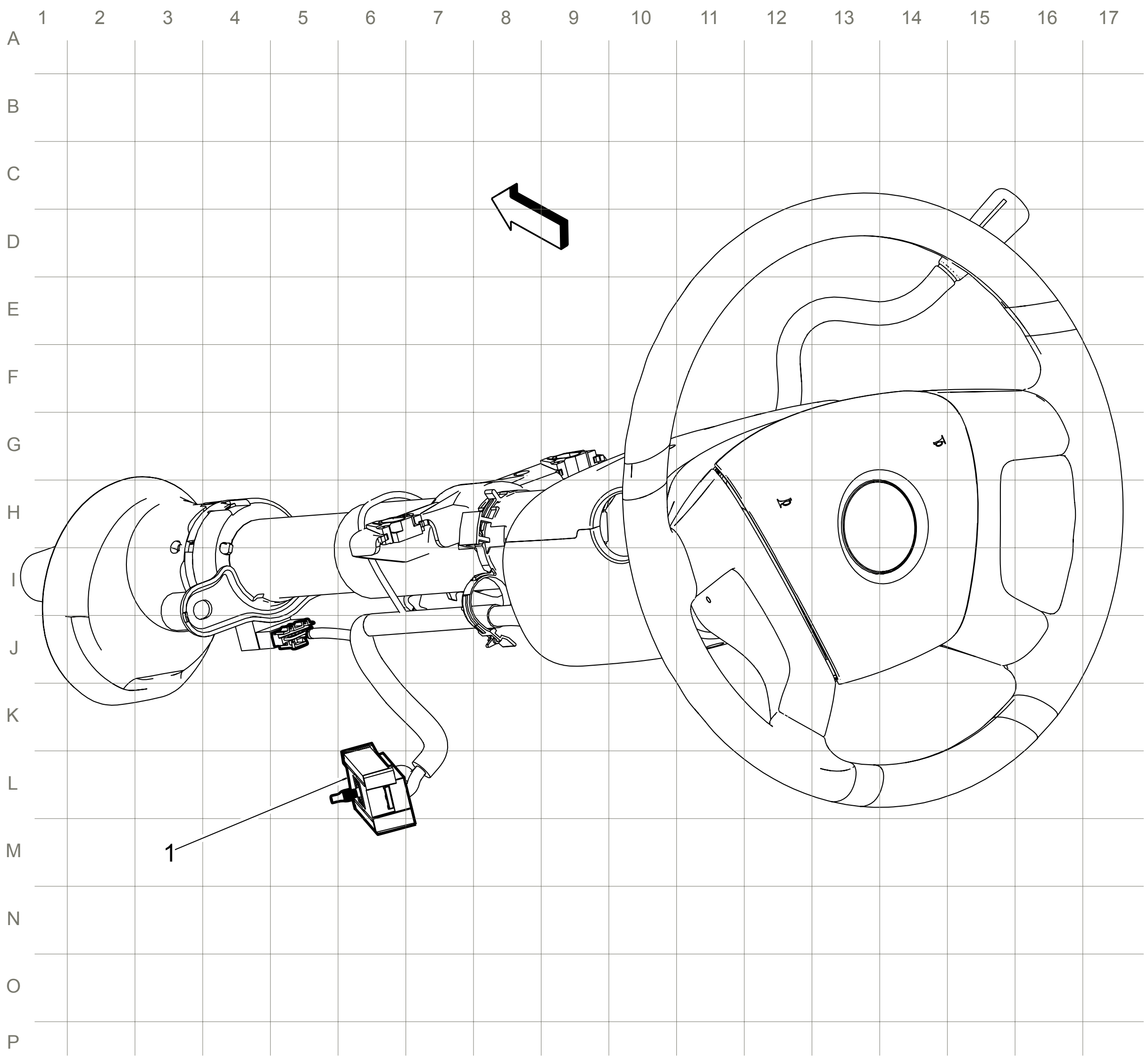
Items

1. G109
2. J163
3. J162

Steering Column Harness Routing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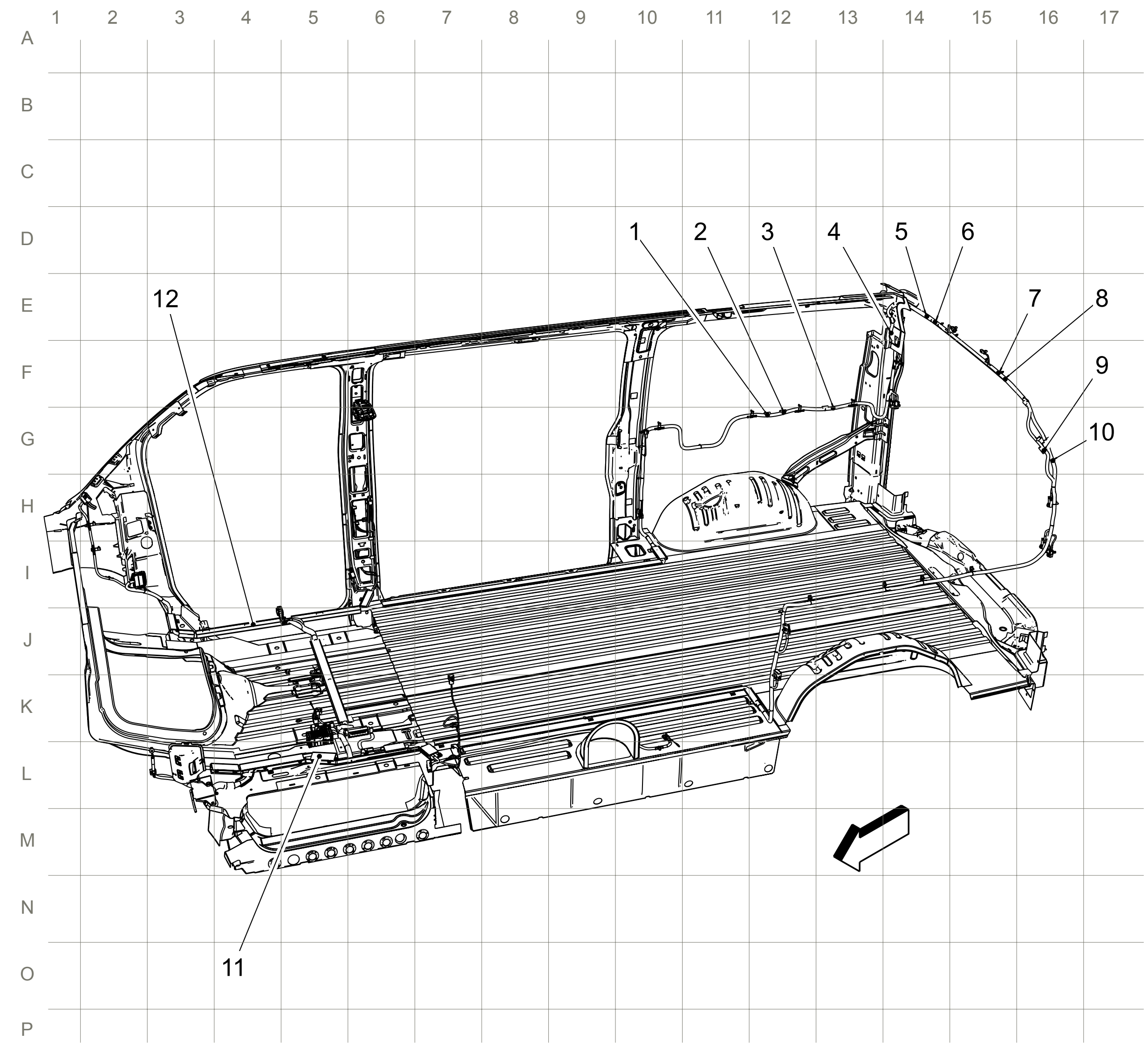
Items

1. X200

Body Harness Routing - Rear Overview (Passenger or Cargo)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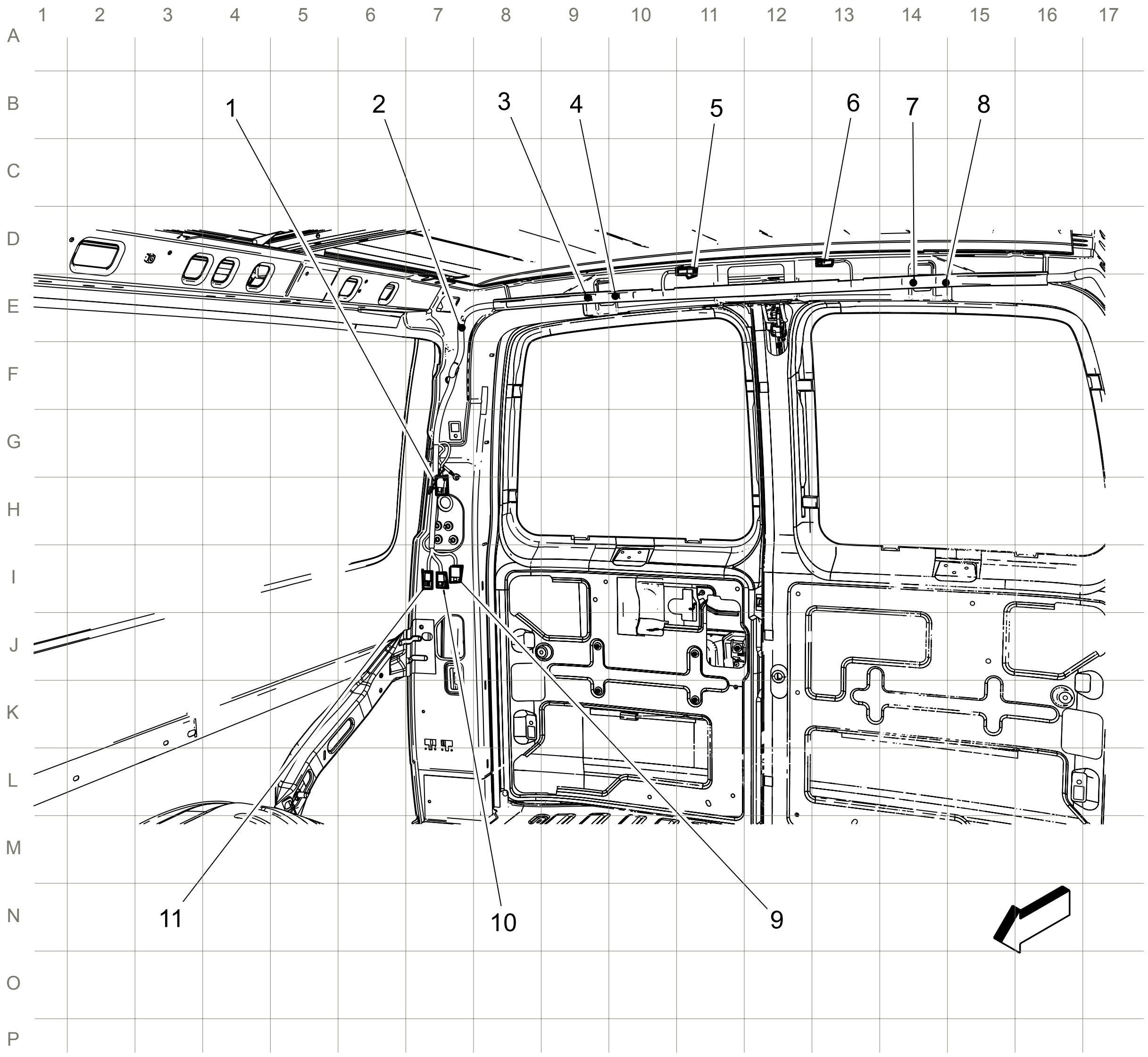
Items

1. J308
2. J310
3. J311
4. J403
5. J451
6. J450
7. J453
8. J452
9. J410
10. J401
11. J356

12. J331

Body Harness Routing - Right Rear (Passenger or Cargo)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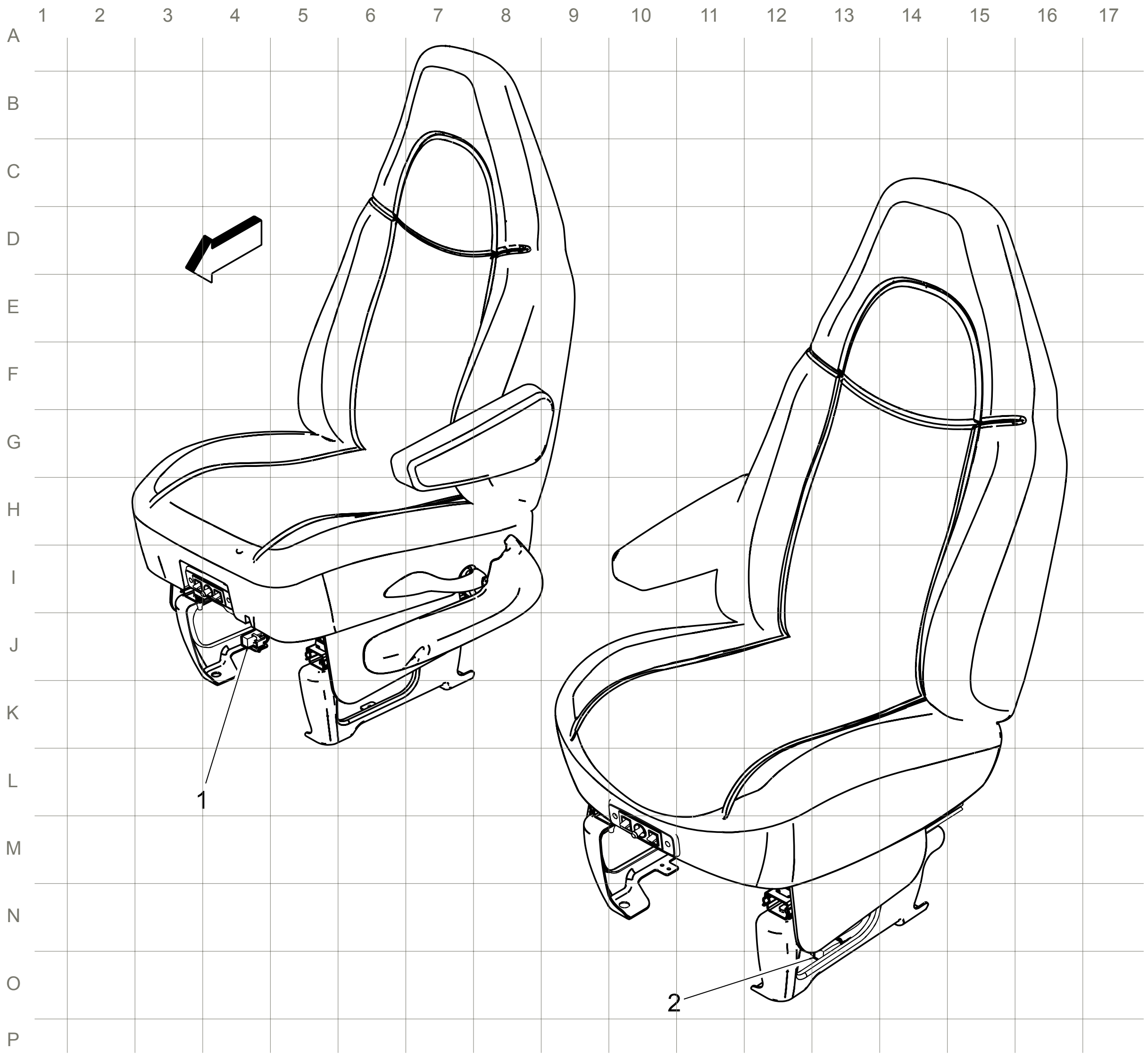
Items

1. X402
2. J403
3. J451
4. J450
5. X320
6. X419
7. J452
8. J453
9. X412
10. X400
11. X403

Driver Seat Harness Routing and Front Passenger Seat Harness Routing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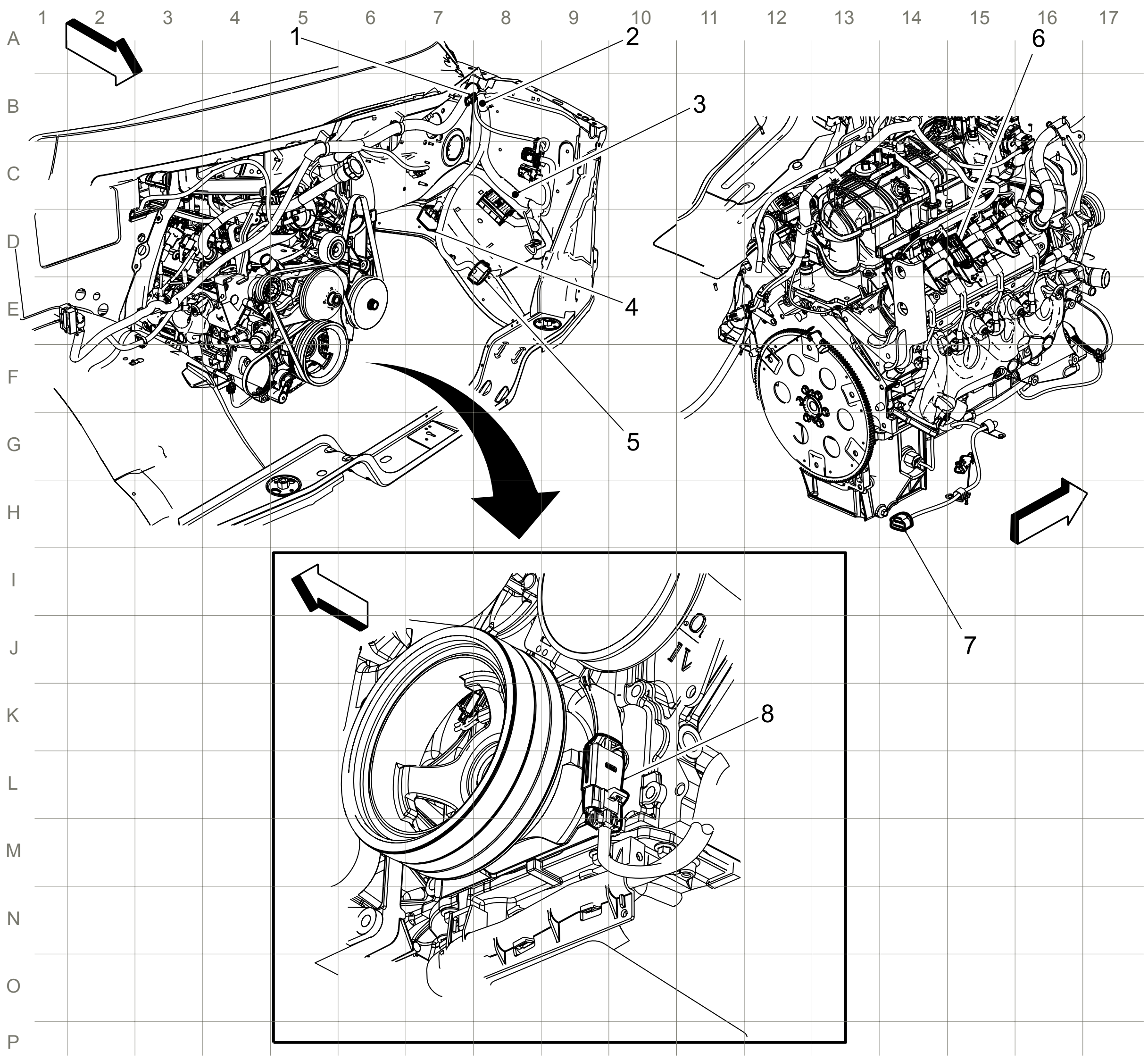
Items

1. X306
2. X307

Engine Harness Routing - Front (L20, L96, or LC8)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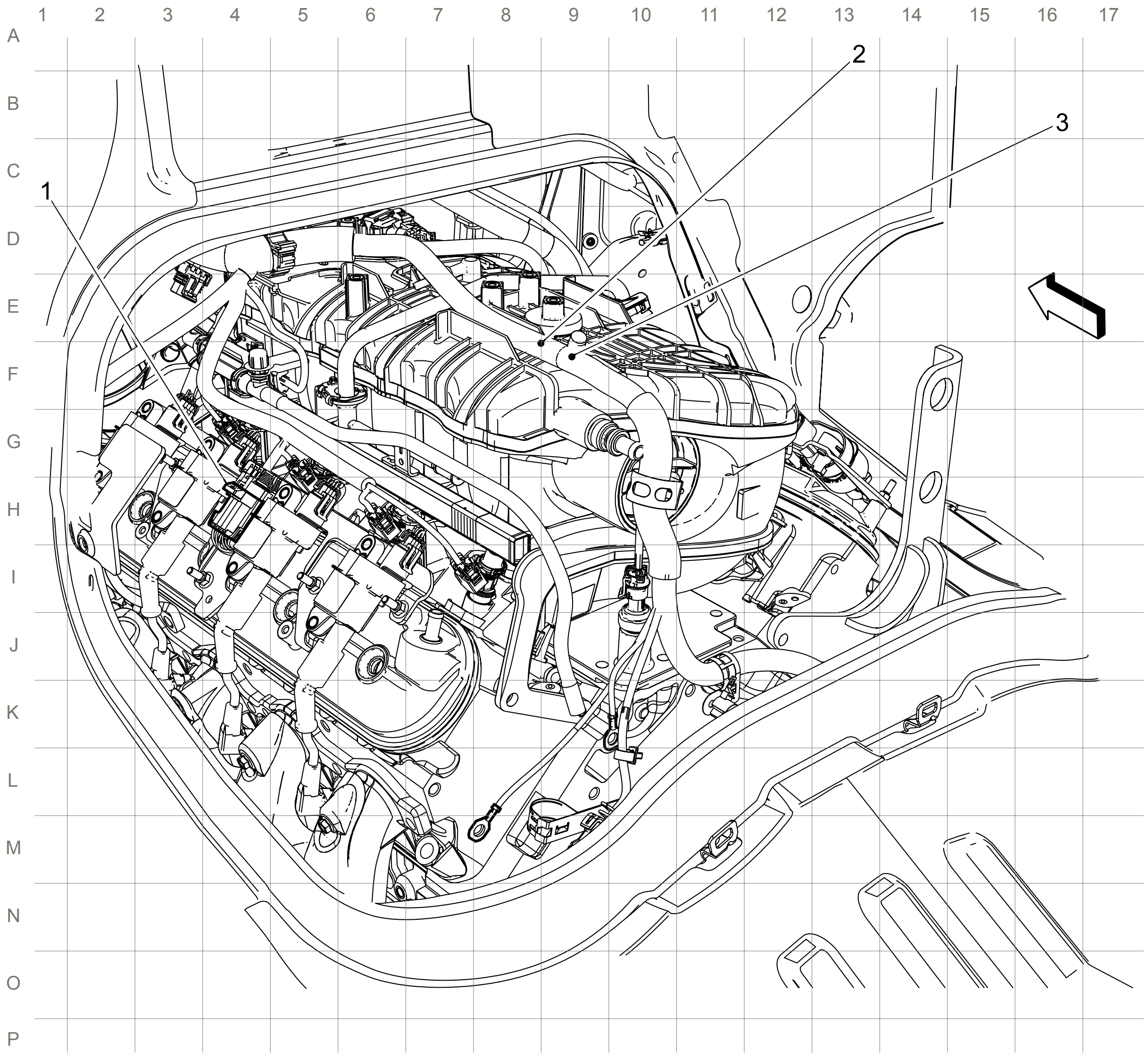
Items

1. X109
2. J115
3. J123
4. X101
5. X100
6. X126
7. X128
8. X177

Engine Harness Routing - Left Rear of Engine (L20, L96, or LC8)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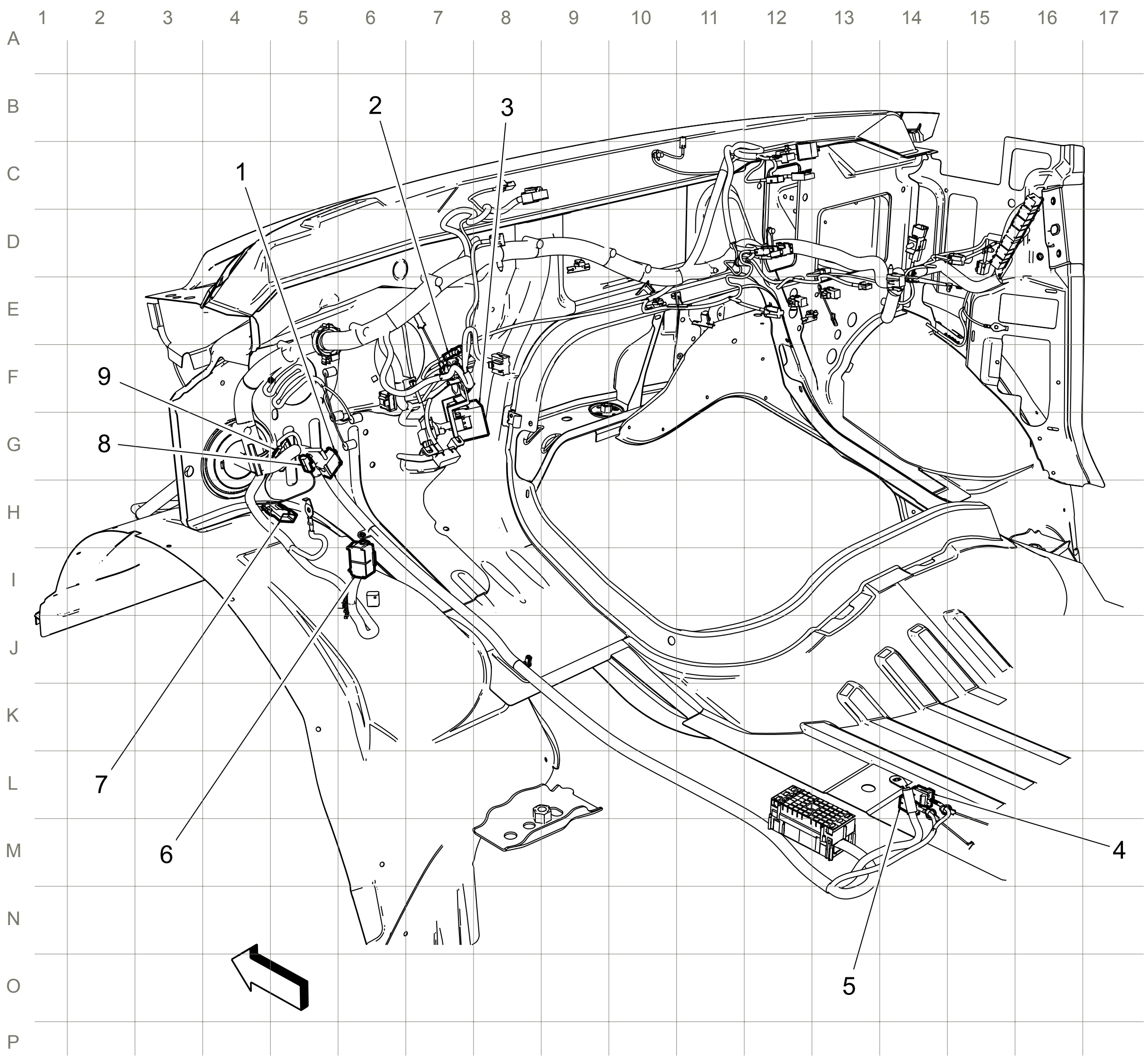
Items

1. X126
2. J101
3. J102

Instrument Panel Harness Routing - Dash Area (1 of 2)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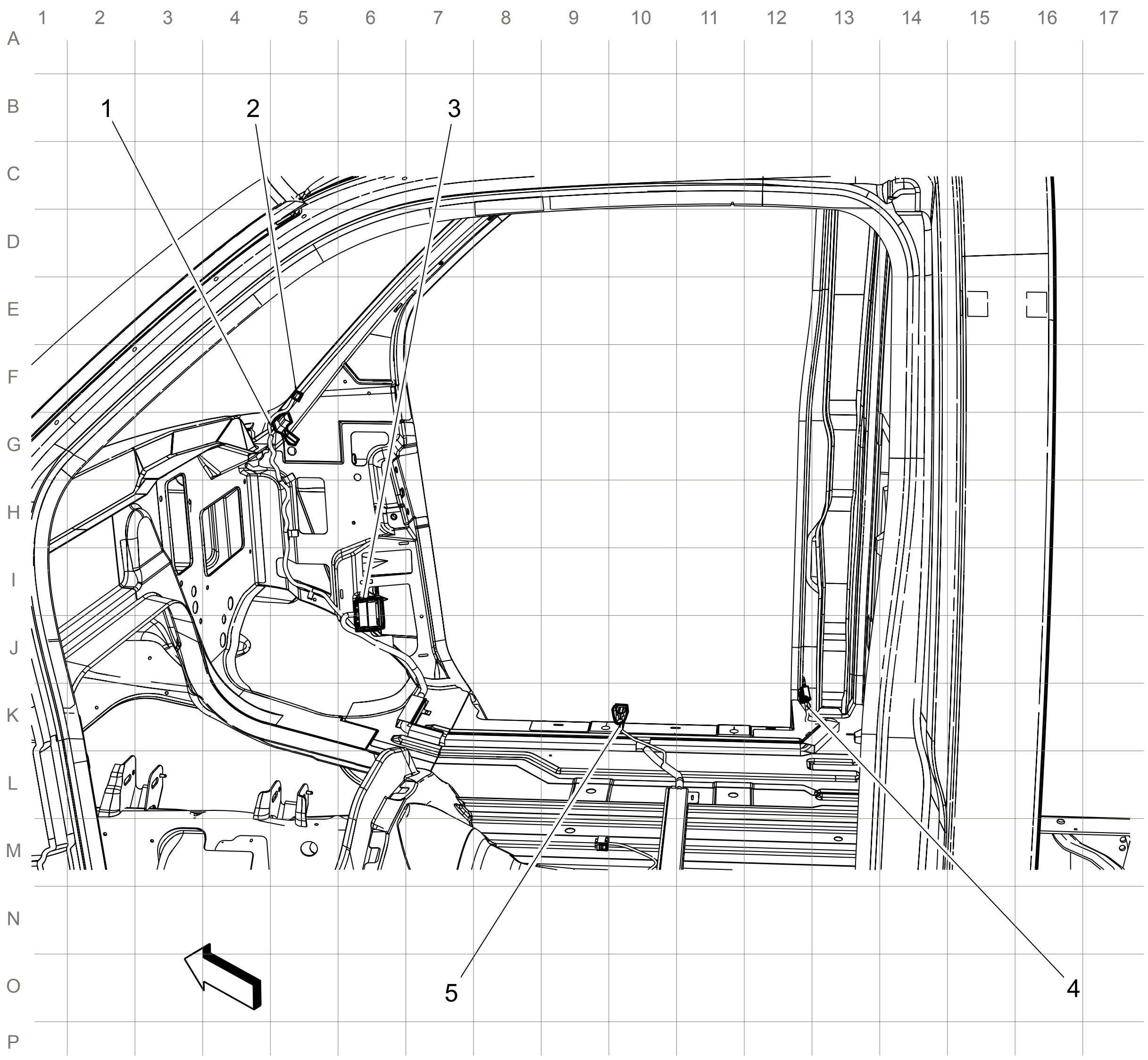
Items

1. JX250
2. X276
3. X200
4. X331
5. X330
6. X318
7. X222
8. X220
9. JX200

Body Harness Routing - Right Front of Passenger Compartment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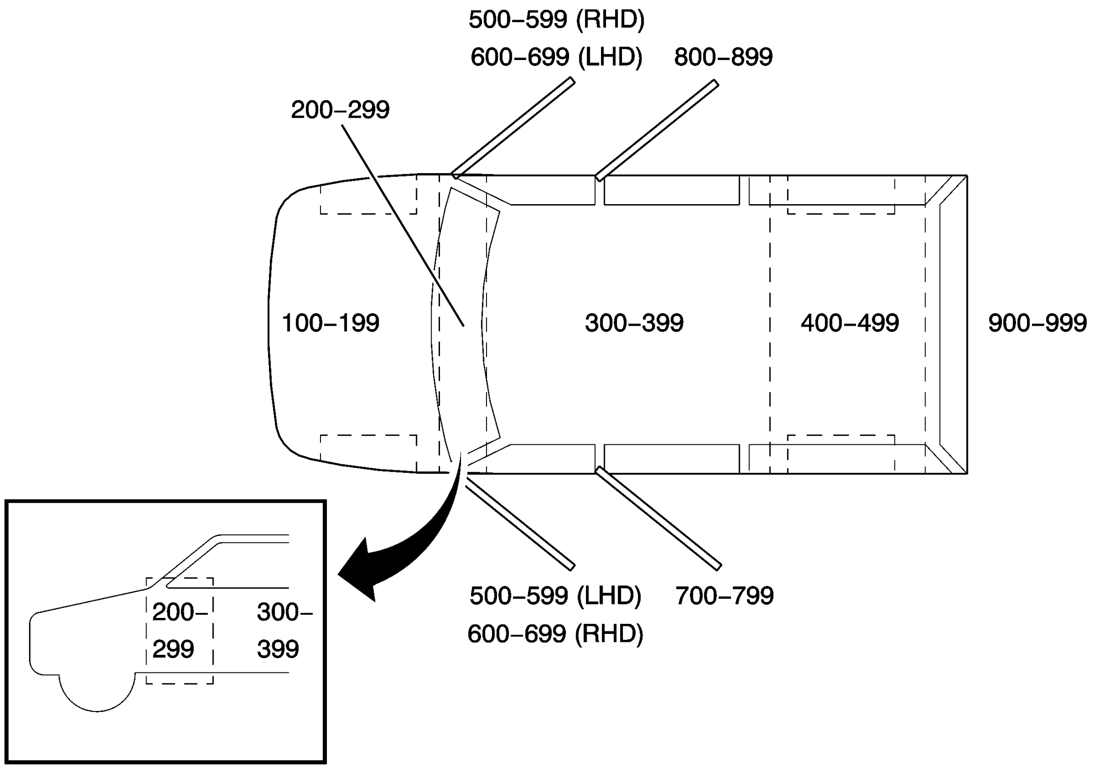
Items

1. X205
2. X204
3. X600
4. JX348
5. X306

Vehicle Zoning Strategy

All grounds, in-line connectors, and splices have identifying numbers that correspond to where they are located in the vehicle. The following table explains the numbering system.



Vehicle Zoning Strategy

Callout Numbers	Zone Description
100-199	Engine compartment (all forward of the instrument panel)
200-299	Within the instrument panel area (between the bulkhead and the front plane of the instrument panel)
300-399	Passenger compartment (from instrument panel to the back of the 2nd row seats)
400-499	Luggage compartment (from the back of the 2nd row seats to the rear of the vehicle, including any additional rows of seating rear of the 2nd row seats)
500-599	Inline harness connectors to or within the driver door
600-699	Inline harness connectors to or within the front passenger door
700-799	Inline harness connectors to or within the left rear door
800-899	Inline harness connectors to or within the right rear door
900-999	Inline harness connectors to or within the liftgate, lift window, endgate, or rear doors

Schematics RPO Code List

RPO	Option Name	Country Group
01U	PRIMARY COLOR-EXTERIOR, SPECIAL (02)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
25U	PRIMARY COLOR-EXTERIOR, DARK MING BLUE (02) 722J	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
40P	WHEEL COLOR-WHITE (91)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
52G	TRIM COMBINATION-CLOTH, MED NEUTRAL II (G) (00)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
52I	INTERIOR TRIM-MED NEUTRAL II (I) (96)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
52W	TRIM COMBINATION-VINYL, MED NEUTRAL II (W) (00)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
5AZ	ACCESSORY-SAFETY KIT - UNIVERSAL	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
5C6	HOOK-CARGO TIE-DN	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
5Y3	ACCESSORY-TOW BALL - TRAILER HITCH	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
8S3	Back-up Alarm, Electrical, 97 Decibels	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
8S8	Wiring Provisions - Odometer Security	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
86U	PRIMARY COLOR-EXTERIOR, WHEATLAND YELLOW (02) 253A	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
93G	TRIM COMBINATION-CLOTH, MED DK PEWTER II (G) (03) (GMT610 - "G" VAN)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
93I	INTERIOR TRIM-MED DK PEWTER II (03) (GMT610 - "G" VAN)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
93W	TRIM COMBINATION-VINYL, MED DK PEWTER II (W) (03) (GMT610 - "G" VAN)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
9N2	GVW RATING-10,050 LBS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
A07	WINDOW-BODY (DO NOT USE AFTER M.Y. 2011)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
A08	WINDOW-BODY, RH (DO NOT USE AFTER M.Y. 2011)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
A12	WINDOW RR-DR, STA	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
A13	WINDOW SIDE DR-RR, STA	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)

A17	WINDOW SIDE BODY-SWING OUT, LH	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
A18	WINDOW RR-DR, SWING OUT	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
A19	WINDOW SIDE DR-RR, SWING OUT	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
A31	WINDOW-POWER OPERATED, ALL DOORS (DO NOT USE ON NEW/MAJOR PROGRAMS)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
ACO	IDENTIFICATION-ACCESSORY CATALOG OFFERING	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
AG1	ADJUSTER FRT ST-POWER, MULTI-DIRECTIONAL, DRIVER	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
AG2	ADJUSTER PASS ST-POWER, MULTI-DIRECTIONAL	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
AJ1	WINDOW TINTED-DEEP, ALL EXCEPT W/S AND DRS (DO NOT USE AFTER M.Y. 2011)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
AJ3	RESTRAINT SYSTEM-SEAT, INFLATABLE, DRIVER, FRT	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
AK5	RESTRAINT SYSTEM-SEAT, INFLATABLE, DRIVER & PASS FRT	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
AL0	SENSOR INDICATOR-INFLATABLE RESTRAINT, FRT PASS/CHILD PRESENCE DETECTOR	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
ANC	SALES PACKAGE-SHUTTLE BUS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
AR7	SEAT-FRT BKT, STANDARD	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
AS5	SEAT-FRT BKT, DELUXE,	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
ASF	RESTRAINT-ROOF SIDE, LH & RH, INFLATABLE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
AT8	RESTRAINT PROVISIONS-CHILD, RR SEAT, RR FACING	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
ATG	LOCK CONTROL, ENTRY-REMOTE ENTRY, STANDARD RANGE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
AU3	LOCK CONTROL-SIDE DR, ELEC	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
AXK	VEHICLE TYPE-TRUCK	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
AXW	VEHICLE TYPE-BUS- (NOT SCHOOL BUS)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
B30	COVERING FLOOR-CARPET	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)

B31	COVERING FLOOR-VINYL, FRT, FULL WIDTH	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
B32	COVERING FRT-FLOOR MATS, AUX	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
B33	COVERING REAR-FLOOR MATS, AUX	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
B38	COVERING FLOOR-VINYL, FRT & RR, FULL WIDTH	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
B3D	SALES PACKAGE-SCHOOL BUS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
B46	TRIM EQUIPMENT-SPECIAL ORDER	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
BA0	ORNAMENTATION-EXTR, DOOR, NAMEPLATE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
BA3	COMPARTMENT-STOWAGE, I/P LOWER EXTENSION DELUXE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
BAG	PARTS PKG-EXPORT	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
BG5	COVERING FLOOR-(NONE)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
BNC	PARTS PKG-BODY MOUNT CUSHIONS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
BTV	REMOTE START-ENGINE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
BUE	KIT-EXHAUST DIESEL	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
C36	HEATER-AUXILIARY	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
C42	HVAC SYSTEM-HEATER, OUTSIDE AIR, DELUXE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
C49	DEFOGGER-RR WINDOW, ELECTRIC	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
C4K	GVW RATING-9,925 LBS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
C4M	GVW RATING-9,900 LBS/4,500 KG	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
C60	HVAC SYSTEM-AIR CONDITIONER FRT, MAN CONTROLS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
C69	HVAC SYSTEM RR-AIR CONDITIONER	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
C6P	GVW RATING-8,600 LBS/3,900 KG	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)

C6Y	GVW RATING-9,600 LBS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
C7I	GVW RATING-14,200 LBS.	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
C7N	GVW RATING-12,300 LBS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
C7Q	GVW RATING-8,800 LBS/4,000 KG	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
C8V	GVW RATING-13,980 LBS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
C99	SWITCH-INFL RST I/P MDL MAN SUPPRESSION	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
CEI	CERTIFICATION-EMISSION, GEOGRAPHICALLY RESTRICTED REGION FOR VEHICLES OVER 14,000 LBS GVW	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
CEJ	CERTIFICATION-EMISSION, FEDERAL FOR VEHICLES OVER 14,000 LBS GVW	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
CEK	EMISSION OVERRIDE-EMISSION OVERRIDE CALIFORNIA SYSTEM FOR VEHICLES OVER 14,000 LBS GVW	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
CEM	EMISSION OVERRIDE-EMISSION OVERRIDE FEDERAL SYSTEM FOR VEHICLES OVER 14,000 LBS GVW	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
CU7	COUNTRY-KUWAIT	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
CU8	COUNTRY-SAUDI ARABIA	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
CV3	COUNTRY-MEXICO	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
CV4	COUNTRY-ISRAEL	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
CW2	COUNTRY-GULF AREAS (BAHRAIN, KUWAIT, OMAN, QATAR, SAUDI ARABIA, UAE)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
CW9	COUNTRY-MISCELLANEOUS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
D28	MIRROR O/S-(-NONE)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
D31	MIRROR I/S R/V-TILT	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
DAA	SUNSHADE-VINYL	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
DE2	MIRROR O/S-LH & RH, MANUAL CONTROL, FOLDING, COLOR	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
DE5	MIRROR O/S-LH & RH, REMOTE CONTROL, ELECTRIC, HEATED, FOLDING, COLOR.	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)

DEB	MIRROR O/S-LH & RH, REMOTE CONTROL, ELECTRIC, HEATED, FOLDING, COLOR. SINGLE PANE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
DH6	MIRROR I/S FRT VAN-LH & RH, SUNSHADE, ILLUM	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
DHC	MIRROR O/S-LH & RH, MANUAL CONTROL, AUX WFOV, COLOR	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
DNS	EQUIPMENT-SUPPLIER INSTALLED	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
DRJ	MIRROR I/S R/V-TILT, PARTIAL VIDEO DISPLAY	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
DT4	ASHTRAY-CIGARETTE LIGHTER	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
E24	DOOR SIDE-REAR, HINGED	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
E3T	HANDLE-I/S, DOOR RELEASE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
E48	COVER-RADIATOR GRILLE OPG - COLD CLIMATE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
EF7	COUNTRY-UNITED STATES OF AMERICA (USA)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
ENC	HVAC PROVISIONS-AUXILLIARY HEATER PLUMBING & WIRING	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
EVA	TEST-DVT, EVAP EMISSION REQUIREMENT	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
EXP	EXPORT-	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
FE9	CERTIFICATION-EMISSION, FEDERAL	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
FHO	VEHICLE FUEL-GASOLINE E10	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
FHS	VEHICLE FUEL-GASOLINE E85	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
FHX	VEHICLE FUEL-DIESEL B20	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
FHZ	VEHICLE FUEL-DEDICATED CNG	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
G7C	PRIMARY COLOR-EXTERIOR, PULL ME OVER RED SOLID (130X)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
G7J	PRIMARY COLOR-EXTERIOR, UNRIPENED GREEN MET (136X)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
G7K	EQUIPMENT-ANTENNA, CABLE AND GROUNDPLATE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)

G80	AXLE POSITRACTION-LIMITED SLIP	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
GAN	PRIMARY COLOR-EXTERIOR, SWITCHBLADE SILVER MET (G) 636R	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
GAZ	PRIMARY COLOR-EXTERIOR, SUMMIT WHITE (G) 8624	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
GBA	PRIMARY COLOR-EXTERIOR, BLACK (G) 8555	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
GBV	PRIMARY COLOR-EXTERIOR, CYBER GRAY MET (G) 637R	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
GH0	AXLE REAR-3.54 RATIO	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
GT4	AXLE REAR-3.73 RATIO	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
GT5	AXLE REAR-4.10 RATIO	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
GU6	AXLE REAR-3.42 RATIO	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
GWX	PRIMARY COLOR-EXTERIOR, SUBTERRANEAN MET (105V)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
I16	ENGINEERING YEAR-2016	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
JFF	GVW RATING-10,100 LBS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
JH6	BRAKE-HYD POWER, 4 WHL DISC.	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
JH9	BRAKE-HYD POWER, 4 WHL DISC, 14,200 LBS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
JL4	CONTROL,-ACTIVE BRAKE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
K05	HEATER ENG-BLOCK	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
K08	HEATER-AUXILIARY, FUEL FIRED	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
K34	CRUISE CONTROL-AUTOMATIC, ELECTRONIC	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
K50	FUEL-FITTING, LINE TAKE-OFF	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
K68	GENERATOR-105 AMP	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
KC4	COOLING SYSTEM-ENG OIL	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)

KD1	COOLING SYSTEM-TRANS, OIL	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
KD9	GENERATOR-145 AMP, DUAL	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
KG3	GENERATOR-145 AMP	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
KI4	RECEPTACLE-ELECTRICAL, ACCESSORY 110 VOLT	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
KO7	VEHICLE FUEL-DEDICATED LIQUEFIED PETROLEUM GAS, LIQUID	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
KUP	THROTTLE CONTROL-ELECTRONIC	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
KW5	GENERATOR-220 AMP	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
L20	ENGINE-GAS, 8 CYL, 4.8L, SFI, E85 MAX, IRON, GM	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
L96	ENGINE-GAS, 8 CYL, 6.0L, SFI, E85 MAX, IRON, GM	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
LC8	ENGINE-LPG/CNG, 8 CYL, V8, 6.0L, SFI, GEN 1, GMNA	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
LGH	ENGINE-DIESEL, 8 CYL, 6.6L, DI, V8, TURBO, DURAMAX	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
MTF	PROVISIONS-FIRE EXTINGUISHER MOUNTING	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
MYD	TRANSMISSION-AUTO 6 SPD, HMD, 6L90	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
N12	EXHAUST SYSTEM-REAR EXIT	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
N33	STEERING COLUMN-TILT TYPE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
NB8	EMISSION OVERRIDE-CALIFORNIA SYSTEM	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
NC7	EMISSION OVERRIDE-FEDERAL SYSTEM	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
NC8	EMISSION SYSTEM-CALIFORNIA, ULEV (NOTE: NOT TO BE USED AFTER 2007MDL YR FOR DOMESTIC NAO PASS CAR & LT DUTY TRUCKS)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
NCF	LOCK-CHILD SECURITY FEATURE - NONE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
NE1	CERTIFICATION-EMISSION, GEOGRAPHICALLY RESTRICTED REGISTRATION FOR VEHICLES UP TO 14,000 LBS GVW (USE 2003 MDL YR	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
NE7	FUEL TANK-216L, 57 GAL	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)

NP5	STEERING WHEEL-LEATHER WRAPPED	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
NPL	PLATE-NAME - NONE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
NT7	EMISSION SYSTEM-FEDERAL, TIER 2	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
NTB	EMISSION SYSTEM-FEDERAL, TIER 3	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
NUK	EMISSION SYSTEM-CALIFORNIA, ULEV250	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
NUM	EMISSION SYSTEM-CALIFORNIA, LEV3 MDV 10-14K GVW	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
P03	COVER, WHEEL-VAR 3	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
PNC	PANEL-TRIM, FRT DOORS & SI RR DOOR(S) & RR DOORS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
PPC	PANEL-TRIM, RR DOORS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
PRP	SALES PACKAGE-COMMERCIAL TRADESMAN	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
QB5	WHEEL-16 X 6.5, J, STEEL (DO NOT USE AFTER M.Y. 2011)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
QT4	WHEEL-16 X 6.5, STEEL H.D. (DO NOT USE AFTER M.Y. 2011)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
R04	WHEEL CONFIGURATION-RR, SINGLE (DO NOT USE AFTER M.Y. 2011)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
R05	WHEEL CONFIGURATION-RR, DUAL (DO NOT USE AFTER M.Y. 2011)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
R25	APPEARANCE PACKAGE-EXTERIOR, CHROME GRILLE & PAINTED BUMPER	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
R26	APPEARANCE PACKAGE-EXTERIOR, CHROME GRILLE & FRONT BUMPER	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
RVG	ACCESSORY-ADAPTER - TRAILER HARNESS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
RVX	ACCESSORY-BALL MOUNT - TRAILER HITCH	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
RYS	ACCESSORY-FIRE EXTINGUISHER	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
RYT	ACCESSORY-FIRST AID KIT	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
RYY	ACCESSORY-FLOOR MATS - MOLDED VINYL	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)

RZW	ACCESSORY-HARNESS - TRAILER HITCH	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
S08	ACCESSORY-HIGHWAY SAFETY KIT	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
S09	ACCESSORY-HITCH MOUNT ASSEMBLY	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
S40	ACCESSORY-LINER - TRUNK/CARGO AREA	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
S44	ACCESSORY-LOCKING PIN - TRAILER HITCH	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
S52	ACCESSORY-MOLDED HOOD PROTECTOR - SMOKED	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
S6N	ACCESSORY-RECEIVER COVER - TRAILER HITCH	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
S6Q	ACCESSORY-ROADSIDE ASSISTANCE PACKAGE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
SAO	ACCESSORY-SMOKERS PACKAGE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
SDD	ACCESSORY-TRAILER HITCH - FIXED	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
SDI	ACCESSORY-TRIANGLE - REFLECTIVE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
SDS	ACCESSORY-WEATHER DEFLECTORS - SIDE WINDOW - SMOKED	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
SFE	ACCESSORY-WHEEL LOCKS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
SFV	ACCESSORY-WIRELESS NETWORK INTERFACE MODULE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
T74	CONTROL, HEADLAMPS-AUTOMATIC, DELAY	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
TGA	LANGUAGE CONTROL-ENGLISH, FRENCH, SPANISH	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
TGG	LANGUAGE CONTROL-ENGLISH, ARABIC, FRENCH	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
TP2	BATTERY-AUXILIARY (DO NOT USE AFTER 2011 ON NEW/MAJOR PROGS, USE K4B)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
TR9	LAMP GROUP-	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
U05	HORN-DUAL	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
U0F	RADIO-AM/FM STEREO, CAF, RSA, MUSIC NAVIGATOR, GRAPHICS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)

U0H	RADIO-AM/FM STEREO, USB, GMNA	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
U19	SPEEDOMETER-INST, KILO & MILES, KILO ODOMETER	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
U2J	DIGITAL AUDIO SYSTEM-S-BAND - NONE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
U2K	DIGITAL AUDIO SYSTEM-S-BAND	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
U73	ANTENNA-FIXED, RADIO	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
U74	ANTENNA-RADIO - NONE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
U80	DISPLAY-COMPASS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
UA1	BATTERY-HIGH CAPACITY, WET (DO NOT USE AFTER 2011 ON NEW/MAJOR PROGS)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
UA7	THEFT DETERENT SYS-EXPORT SPECIFIC, VAR #02 (DO NOT USE AFTER 2009 GLOBAL/NEW MAJOR PROGRAMS)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
UBS	DIGITAL AUDIO SYSTEM-S-BAND AND TRAFFIC	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
UC2	SPEEDOMETER-INST, KILO & MILES, KILO ODOMETER, POSITIVE BIAS (DO NOT USE AFTER MY 2009 ON NEW/MAJOR PRGMS)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
UD4	ALARM-VEHICLE SPEED, 120 K/H (DON'T USE AFTER 2010 ON NEW MAJORS - USE CTY COD &/OR VCS FAM COD INSTEAD)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
UD7	PARK ASSIST-REAR	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
UE0	COMMUNICATION SYSTEM-VEHICLE - NONE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
UE1	COMMUNICATION SYSTEM-VEHICLE, ONSTAR	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
UF2	LAMP-CARGO	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
UF3	SWITCH-HIGH IDLE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
UFA	DISPLAY-OUTSIDE TEMPERATURE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
UFM	PARTS PKG-COMPLETE VEHICLE KIT, 3 TANK	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
UFP	PARTS PKG-COMPLETE VEHICLE KIT, 4 TANK	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
UI8	RADIO-AM/FM, TOUCHSCREEN, NAVIGATION, CONNECTED, CD, AUX JACK, USB PORT	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)

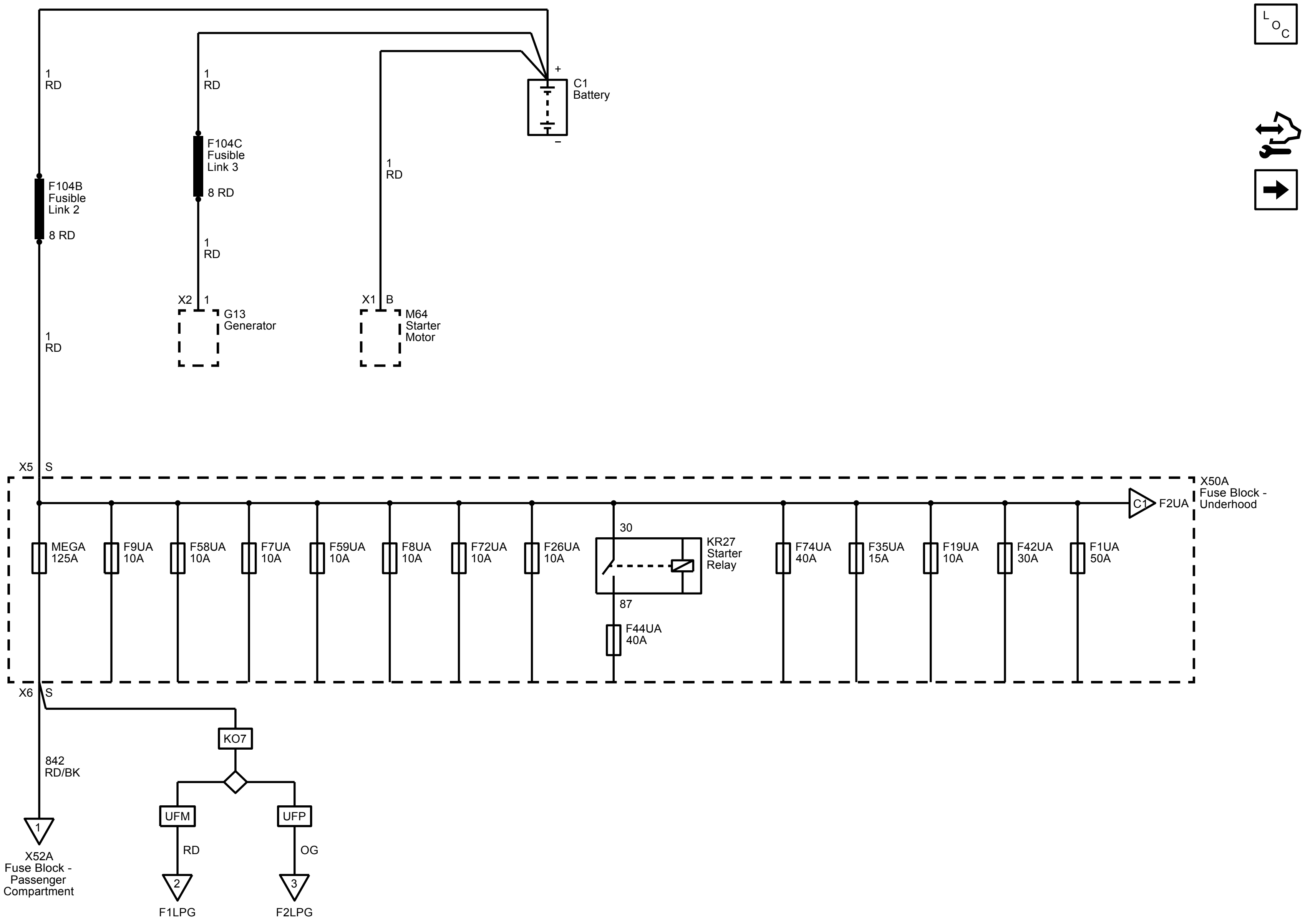
UJ1	INDICATOR-SYSTEM, BRAKE WARNING	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
UJM	TIRE PRESS INDICATOR-MANUAL LEARN	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
UL2	FREQUENCIES-EUROPEAN	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
UL5	RADIO-(NONE)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
UL8	FREQUENCIES-SAUDI ARABIAN	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
UPF	WIRELESS INTERFACE-SHORT RANGE, VOICE REC	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
US8	RADIO-AM/FM STEREO, SEEK/SCAN, CD, AUTO TONE, CLOCK, ETR, MP3, RDS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
USR	RECEPTACLE-USB	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
UVC	VISION-REAR VIEW, MONO, ANALOG	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
UXZ	RADIO-PROVISIONS FOR	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
UY7	WIRING HARNESS-TRUCK TRAILER, HD	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
V10	PROVISION OPTIONS-COLD WEATHER	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
V14	COOLER-OIL, TRANSMISSION, AUX	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
V22	GRILLE-RADIATOR, CHROME	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
V37	BUMPER-FRT & RR, CHROME	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
V46	BUMPER FRT-CHROME	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
V4D	CALIBRATION-SEPARATED STOP/TURN SIGNAL CIRCUITS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
V8D	VEHICLE STATEMENT-US	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
V8I	VEHICLE STATEMENT-ISRAEL	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
VBX	LANGUAGE LABEL-ARABIC	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
VC5	LABEL-SHIPPING, EXCEPT US, US POSSESSIONS, OR JAPAN	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)

VG8	VEHICLE-LABEL, NOTICE TO BUYER	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
VH6	BUMPER FRT-BLACK	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
VJG	BUMPER RR-BLACK	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
VK3	LICENSE PLATE FRONT-FRT MOUNTING PKG	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
VK5	SEAT-TEMPORARY, FOR SHIPPING	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
VLL	ACCESSORY-CROSS RAILS - ROOF RACK - REMOVABLE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
VLP	ACCESSORY-BULKHEAD DIVIDER	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
VLU	ACCESSORY-SECURITY SCREEN PACKAGE - REAR WINDOW W/O POP - OUT	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
VLV	ACCESSORY-LADDER RACK - ROOF MOUNTED - SWING OUT	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
VLW	ACCESSORY-BULKHEAD DIVIDER WITH DOOR	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
VP6	NOISE CONTROL-	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
VPH	VEHICLE PREPARATION-OVERSEAS DELIVERY	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
VQK	ACCESSORY-SPLASH GUARDS - CUSTOM MOLDED	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
VR4	TRAILER HITCH-WEIGHT DISTRIBUTING PLATFORM	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
VR6	HOOK-TIE-DN SHPG	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
VT7	OWNERS MANUAL-ENGLISH LANGUAGE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
VXT	VEHICLE TYPE-INCOMPLETE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
VXW	ACCESSORY-ASSIST STEPS - MOLDED	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
W1Y	CONTROL-STEERING WHEEL, RADIO, REDUNDANT CONTROLS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
WEN	PLANT CODE-WENTZVILLE, MO, USA	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
WMG	VIN MODEL YEAR-2016	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)

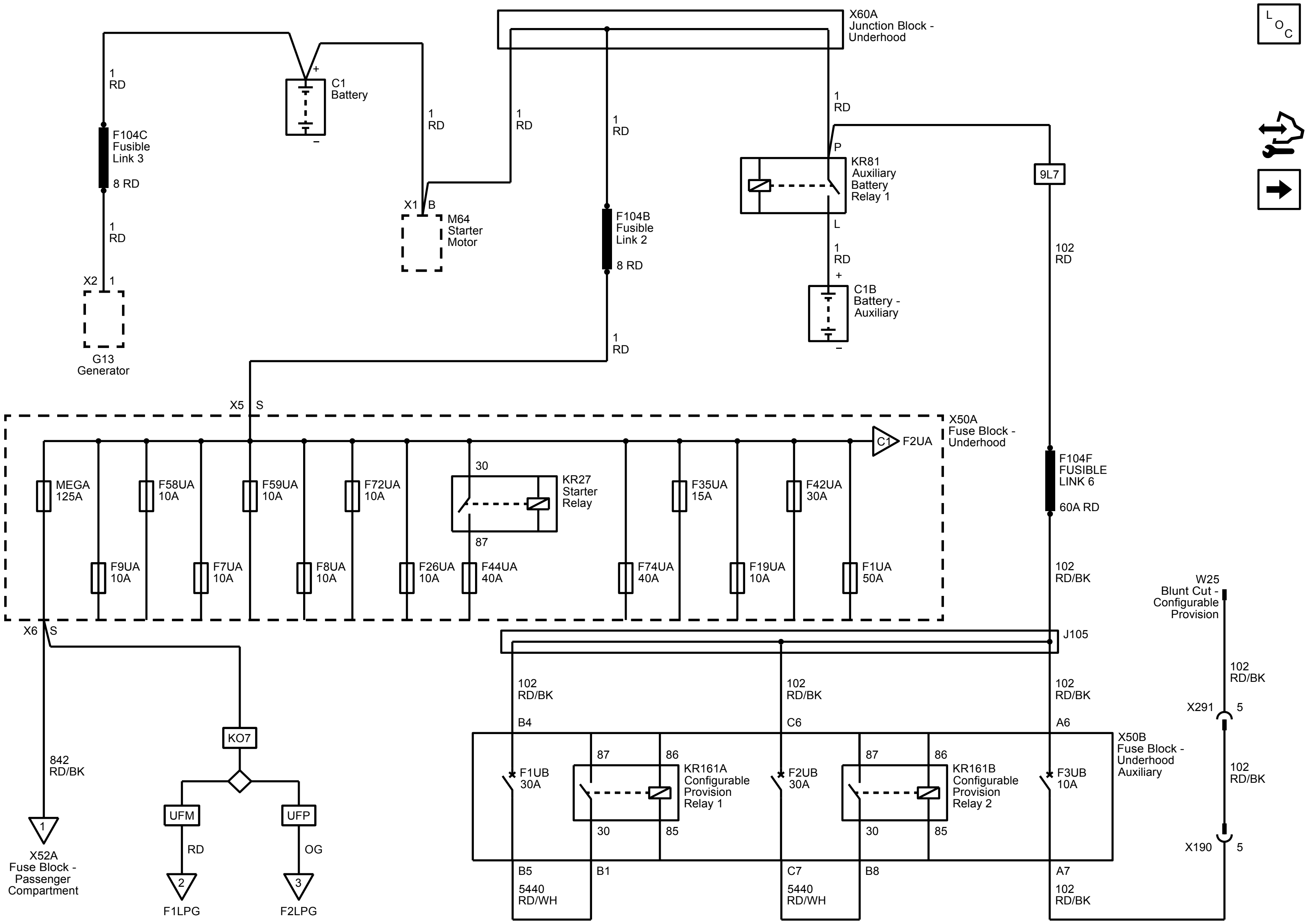
X88	MARKET BRAND-CHEVROLET	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
XHF	TIRE FRONT-LT225/75R16 E 115/112 S BL ALS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
XIW	TIRE FRONT-LT245/75R16 E 120/116R BW OOR	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
XL7	FREQUENCIES RATING-315 MHZ, LONG DISTANCE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
XL8	FREQUENCIES RATING-433 MHZ	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
XLP	TIRE FRONT-LT245/75R16 E 120/116 S BW ALS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
Y3H	SALES PACKAGE-HANDICAPPED, MOBILITY, PARATRANSIT	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
YA2	DOOR SIDE-REAR, SLIDING	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
YB9	PAINT PROCESS-INTERIOR - NONE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
YC6	PACKAGE, CONVENIENCE-DECOR LEVEL #6	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
YF1	SALES PACKAGE-CUTAWAY UPFITTER	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
YF2	SALES PACKAGE-AMBULANCE UPFITTER	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
YF5	CERTIFICATION-EMISSION, CALIFORNIA	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
YF7	SALES PACKAGE-RECREATIONAL VEHICLE, UPFITTER	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
YHF	TIRE REAR-LT225/75R16 E 115/112 S BL ALS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
YIW	TIRE REAR-LT245/75R16 E 120/116R BW OOR	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
YLP	TIRE REAR-LT245/75R16 E 120/116 S BW ALS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
YM8	IDENTIFICATION-LIMITED PERSONALIZATION OPTION (LPO)	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
Z49	COUNTRY-CANADA	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
Z82	TRAILER PROVISIONS-SPECIAL EQUIPMENT, H.D.	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
Z88	MARKET BRAND-GMC	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)

ZHF	TIRE SPARE-LT225/75R16 E 115/112 S BL ALS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
ZIW	TIRE SPARE-LT245/75R16 E 120/116R BW OOR	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
ZLP	TIRE SPARE-LT245/75R16 E 120/116 S BW ALS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
ZP0	SEATING ARRANGEMENT-TEMPORARY DRIVER	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
ZP3	SEATING ARRANGEMENT-15 PASS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
ZP6	SEATING ARRANGEMENT-5 PASS CARGO	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
ZQ2	SALES PACKAGE-DRIVER CONVENIENCE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
ZQ3	SALES PACKAGE-DRIVER CONVENIENCE II	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
ZR7	APPEARANCE PACKAGE-GRILLE & BUMPER CHROME	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
ZW2	WINDOW PKG-RR DRS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
ZW3	WINDOW PKG-RR DRS, SIDE RR DR	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
ZW4	WINDOW PKG-RH SIDE, RR DRS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
ZW6	WINDOW PKG-COMPLETE BODY	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
ZW9	BODY EQUIPMENT-BASE BODY OR CHASSIS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
ZX1	SEATING ARRANGEMENT-DRIVER ONLY, HIGH BACK	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
ZX2	SEATING ARRANGEMENT-DRIVER & PASS, HIGH BACK	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
ZX5	SEATING ARRANGEMENT-12 PASS	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
ZX9	TIRE SPARE-W/WHEEL - NONE	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)
ZY1	COLOR COMBINATION-SOLID	U.S.A., PR and USVI (MAH),Canada (MBC),Mexico (MCX),Africa (MAA),Israel (MBI),Mid-East (MAM)

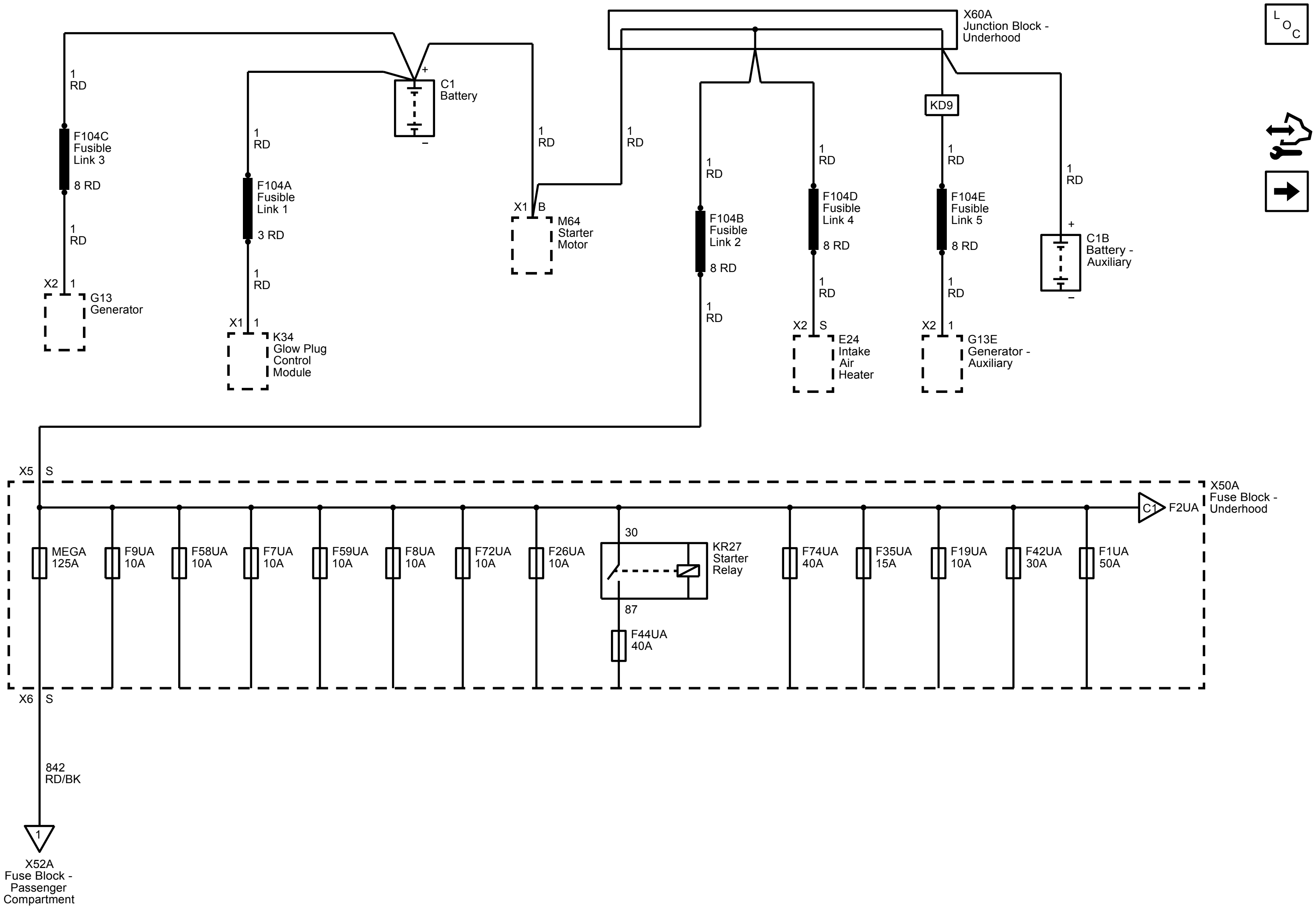
Fusible Links and B+ Bus - Underhood Fuse Block (Gas with One Battery, 1 of 3)


+
C1
Battery
−
1
RD
1
RD
F104C
Fusible
Link 3
8 RD
1
RD
F104B
Fusible
Link 2
8 RD
1
RD
1
RD
X2
1
G13
Generator
X1
B
M64
Starter
Motor
1
RD
X5
S
X50A
Fuse Block -
Underhood
MEGA
125A
F9UA
10A
F58UA
10A
F7UA
10A
F59UA
10A
F8UA
10A
F72UA
10A
F26UA
10A
30
KR27
Starter
Relay
87
F44UA
40A
F74UA
40A
F35UA
15A
F19UA
10A
F42UA
30A
F1UA
50A
C1
F2UA
X6
S
KO7
842
RD/BK
UFM
UFP
RD
OG
1
X52A
Fuse Block -
Passenger
Compartment
2
F1LPG
3
F2LPG

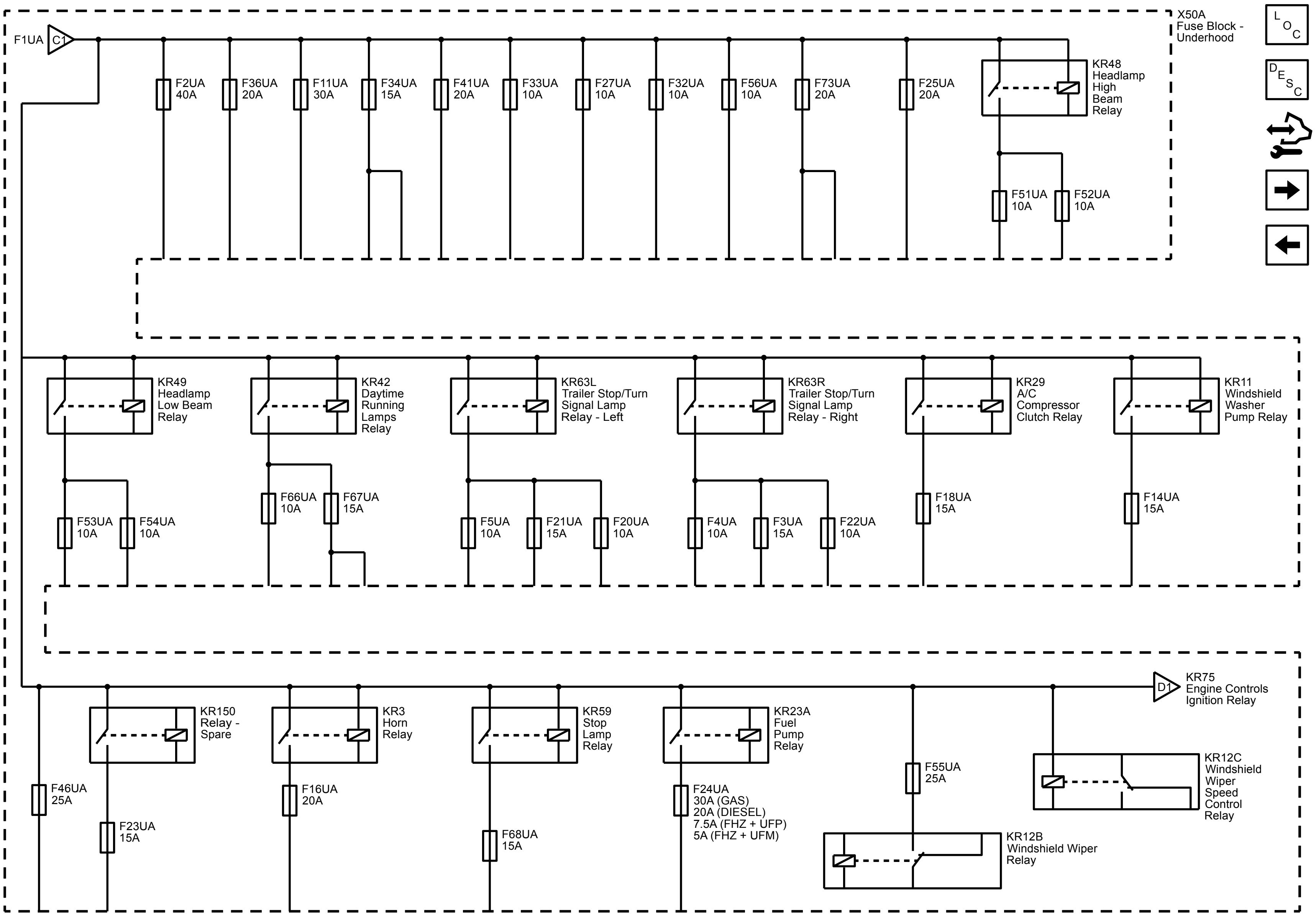
Fusible Links and B+ Bus - Underhood Fuse Block (Gas with Two Batteries, 1 of 3) and Fuse Block - Underhood Auxiliary (9L7)


X60A
Junction Block - Underhood
L O C
1 RD
C1 Battery
+
−
F104C Fusible Link 3
8 RD
1 RD
X2 1
G13 Generator
1 RD
X1 B
M64 Starter Motor
1 RD
1 RD
F104B Fusible Link 2
8 RD
1 RD
1 RD
P
KR81 Auxiliary Battery Relay 1
L
1 RD
+
C1B Battery - Auxiliary
−
9L7
102 RD
X5 S
X50A Fuse Block - Underhood
C1 F2UA
MEGA 125A
F58UA 10A
F59UA 10A
F72UA 10A
30
KR27 Starter Relay
87
F35UA 15A
F42UA 30A
F9UA 10A
F7UA 10A
F8UA 10A
F26UA 10A
F44UA 40A
F74UA 40A
F19UA 10A
F1UA 50A
F104F FUSIBLE LINK 6
60A RD
102 RD/BK
W25 Blunt Cut - Configurable Provision
X6 S
J105
842 RD/BK
KO7
UFM
UFP
RD
OG
1
X52A Fuse Block - Passenger Compartment
2
F1LPG
3
F2LPG
102 RD/BK
B4
102 RD/BK
C6
102 RD/BK
A6
102 RD/BK
X291 5
X50B Fuse Block - Underhood Auxiliary
87
86
F1UB 30A
KR161A Configurable Provision Relay 1
30
85
87
86
F2UB 30A
KR161B Configurable Provision Relay 2
30
85
F3UB 10A
102 RD/BK
X190 5
B5
5440 RD/WH
B1
C7
5440 RD/WH
B8
A7
102 RD/BK

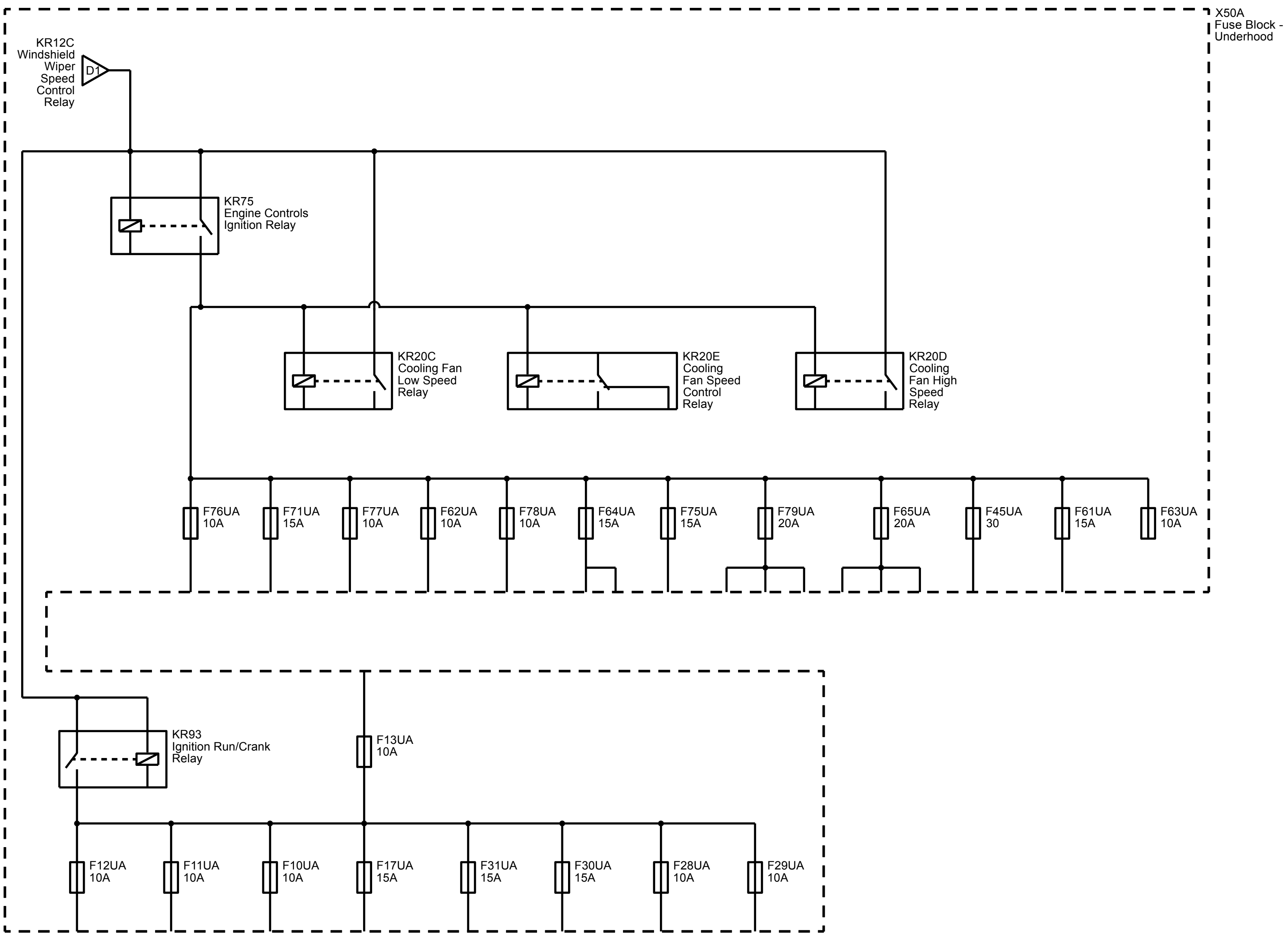
Fusible Links and B+ Bus - Underhood Fuse Block (Diesel, 1 of 3)


X60A
Junction Block - Underhood
C1
Battery
+
−
1
RD
F104C
Fusible
Link 3
8 RD
1
RD
X2
1
G13
Generator
1
RD
F104A
Fusible
Link 1
3 RD
1
RD
X1
1
K34
Glow Plug
Control
Module
1
RD
X1
B
M64
Starter
Motor
1
RD
1
RD
F104B
Fusible
Link 2
8 RD
1
RD
1
RD
F104D
Fusible
Link 4
8 RD
1
RD
X2
S
E24
Intake
Air
Heater
KD9
1
RD
F104E
Fusible
Link 5
8 RD
1
RD
X2
1
G13E
Generator -
Auxiliary
1
RD
+
C1B
Battery -
Auxiliary
−
L O C
X5
S
X50A
Fuse Block -
Underhood
MEGA
125A
F9UA
10A
F58UA
10A
F7UA
10A
F59UA
10A
F8UA
10A
F72UA
10A
F26UA
10A
30
KR27
Starter
Relay
87
F44UA
40A
F74UA
40A
F35UA
15A
F19UA
10A
F42UA
30A
F1UA
50A
C1
F2UA
X6
S
842
RD/BK
1
X52A
Fuse Block -
Passenger
Compartment

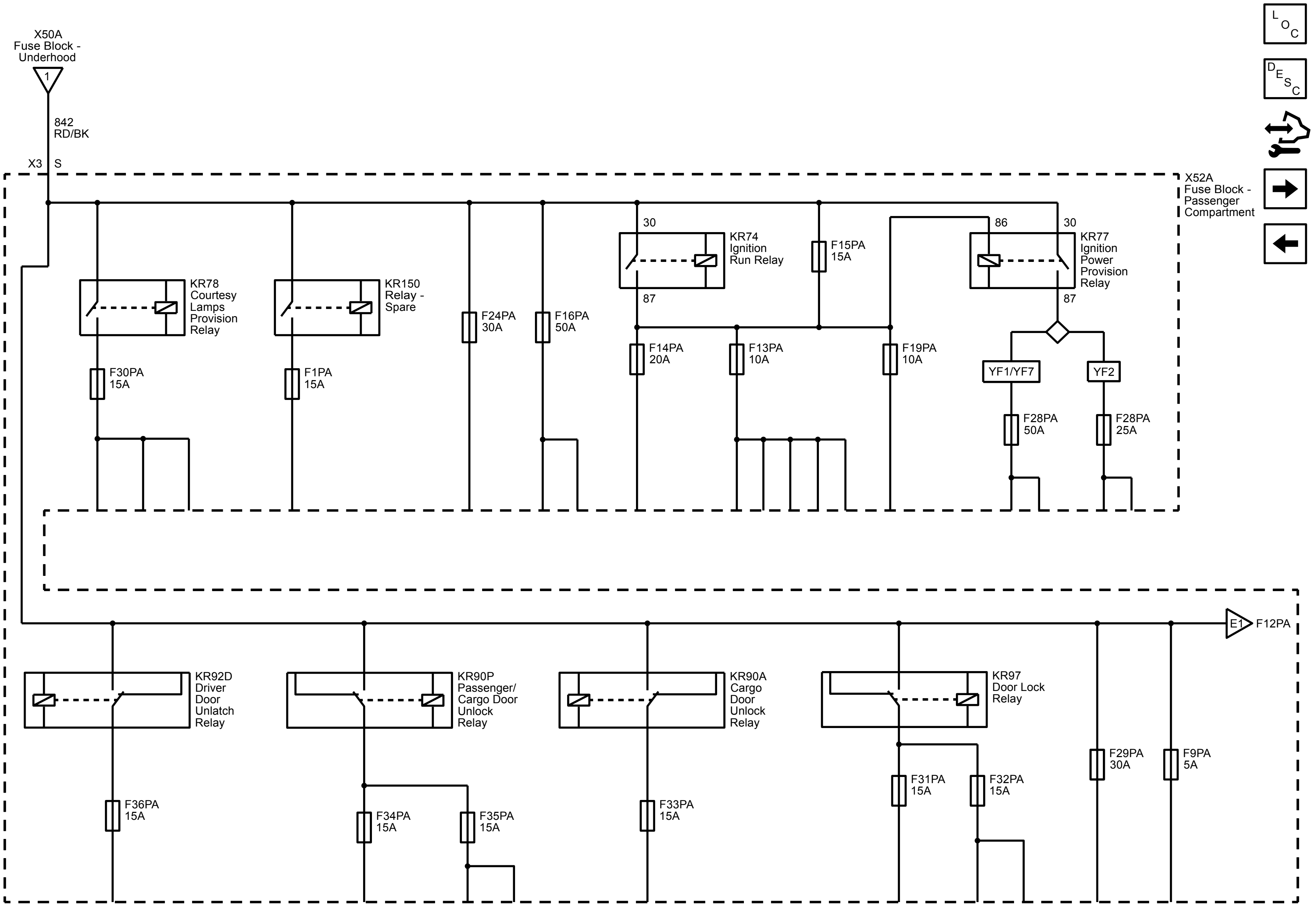
B+ Bus - Underhood Fuse Block (2 of 3)


F1UA
C1
F2UA 40A
F36UA 20A
F11UA 30A
F34UA 15A
F41UA 20A
F33UA 10A
F27UA 10A
F32UA 10A
F56UA 10A
F73UA 20A
F25UA 20A
KR48 Headlamp High Beam Relay
F51UA 10A
F52UA 10A
X50A Fuse Block - Underhood
LOC
DESC
KR49 Headlamp Low Beam Relay
KR42 Daytime Running Lamps Relay
KR63L Trailer Stop/Turn Signal Lamp Relay - Left
KR63R Trailer Stop/Turn Signal Lamp Relay - Right
KR29 A/C Compressor Clutch Relay
KR11 Windshield Washer Pump Relay
F53UA 10A
F54UA 10A
F66UA 10A
F67UA 15A
F5UA 10A
F21UA 15A
F20UA 10A
F4UA 10A
F3UA 15A
F22UA 10A
F18UA 15A
F14UA 15A
D1
KR75 Engine Controls Ignition Relay
KR150 Relay - Spare
KR3 Horn Relay
KR59 Stop Lamp Relay
KR23A Fuel Pump Relay
F46UA 25A
F23UA 15A
F16UA 20A
F68UA 15A
F24UA 30A (GAS) 20A (DIESEL) 7.5A (FHZ + UFP) 5A (FHZ + UFM)
F55UA 25A
KR12C Windshield Wiper Speed Control Relay
KR12B Windshield Wiper Relay

B+ Bus - Underhood Fuse Block (3 of 3)

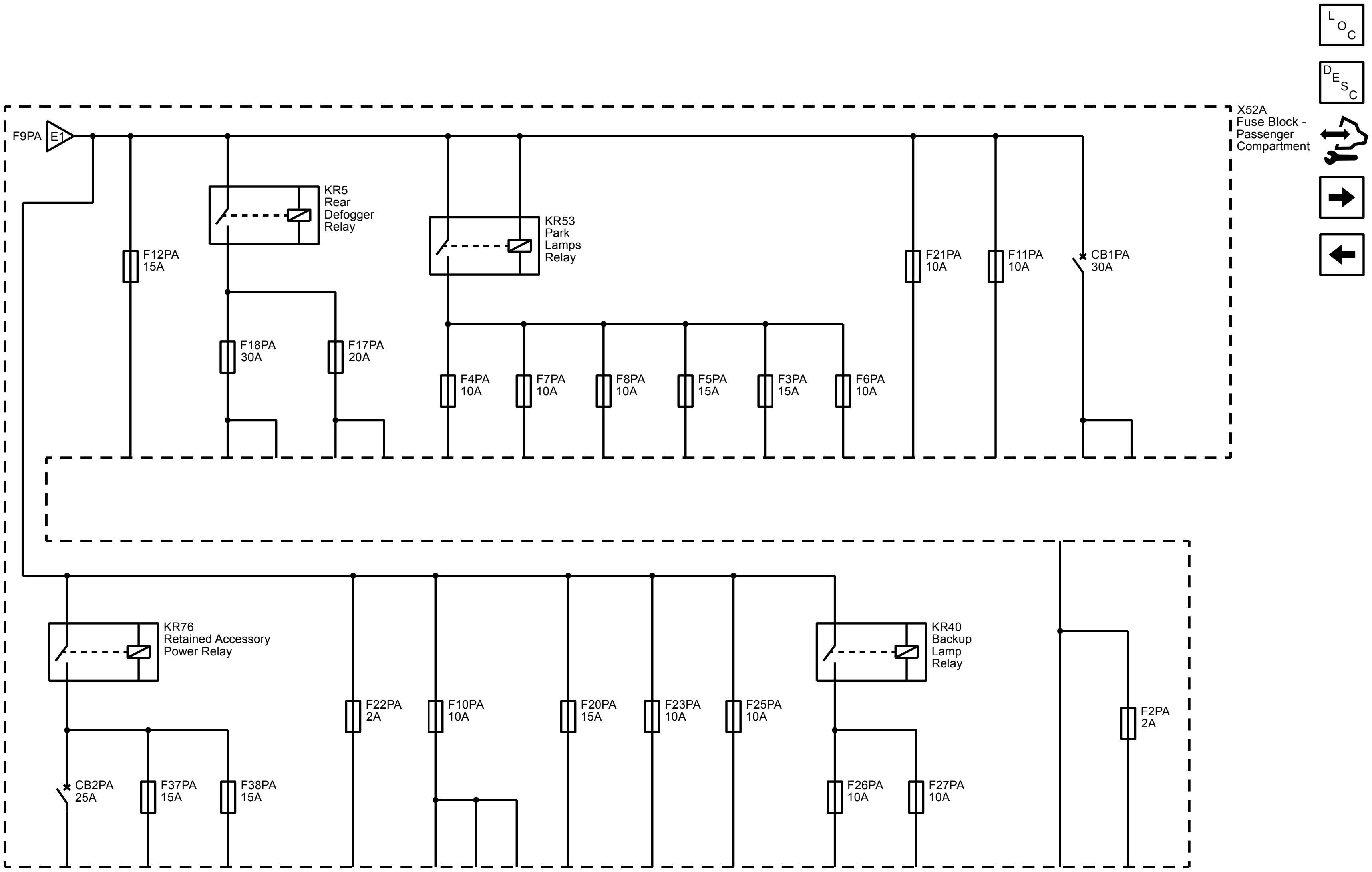

X50A
Fuse Block -
Underhood
KR12C
Windshield
Wiper
Speed
Control
Relay
D1
KR75
Engine Controls
Ignition Relay
KR20C
Cooling Fan
Low Speed
Relay
KR20E
Cooling
Fan Speed
Control
Relay
KR20D
Cooling
Fan High
Speed
Relay
F76UA
10A
F71UA
15A
F77UA
10A
F62UA
10A
F78UA
10A
F64UA
15A
F75UA
15A
F79UA
20A
F65UA
20A
F45UA
30
F61UA
15A
F63UA
10A
KR93
Ignition Run/Crank
Relay
F13UA
10A
F12UA
10A
F11UA
10A
F10UA
10A
F17UA
15A
F31UA
15A
F30UA
15A
F28UA
10A
F29UA
10A

B+ Bus - Passenger Compartment Fuse Block (1 of 2)

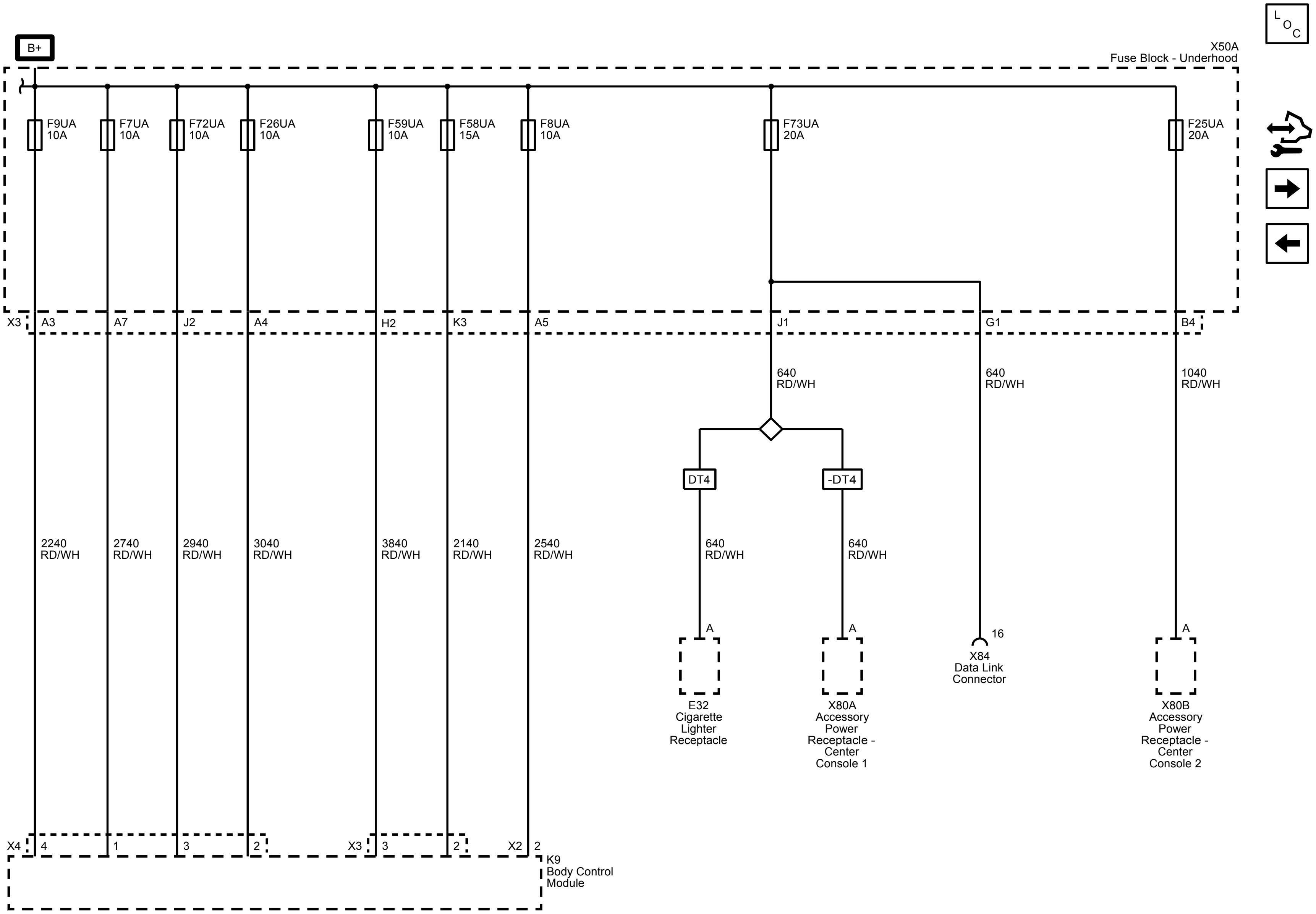


X50A
Fuse Block -
Underhood
1
842
RD/BK
X3
S
X52A
Fuse Block -
Passenger
Compartment
L O C
D E S C
KR78
Courtesy
Lamps
Provision
Relay
KR150
Relay -
Spare
F30PA
15A
F1PA
15A
F24PA
30A
F16PA
50A
30
KR74
Ignition
Run Relay
87
F15PA
15A
86
30
KR77
Ignition
Power
Provision
Relay
87
F14PA
20A
F13PA
10A
F19PA
10A
YF1/YF7
YF2
F28PA
50A
F28PA
25A
E1
F12PA
KR92D
Driver
Door
Unlatch
Relay
KR90P
Passenger/
Cargo Door
Unlock
Relay
KR90A
Cargo
Door
Unlock
Relay
KR97
Door Lock
Relay
F36PA
15A
F34PA
15A
F35PA
15A
F33PA
15A
F31PA
15A
F32PA
15A
F29PA
30A
F9PA
5A

B+ Bus - Passenger Compartment Fuse Block (2 of 2)


L O C
D E S C
X52A
Fuse Block -
Passenger
Compartment
F9PA
E1
F12PA
15A
KR5
Rear
Defogger
Relay
F18PA
30A
F17PA
20A
KR53
Park
Lamps
Relay
F4PA
10A
F7PA
10A
F8PA
10A
F5PA
15A
F3PA
15A
F6PA
10A
F21PA
10A
F11PA
10A
CB1PA
30A
KR76
Retained Accessory
Power Relay
CB2PA
25A
F37PA
15A
F38PA
15A
F22PA
2A
F10PA
10A
F20PA
15A
F23PA
10A
F25PA
10A
KR40
Backup
Lamp
Relay
F26PA
10A
F27PA
10A
F2PA
2A

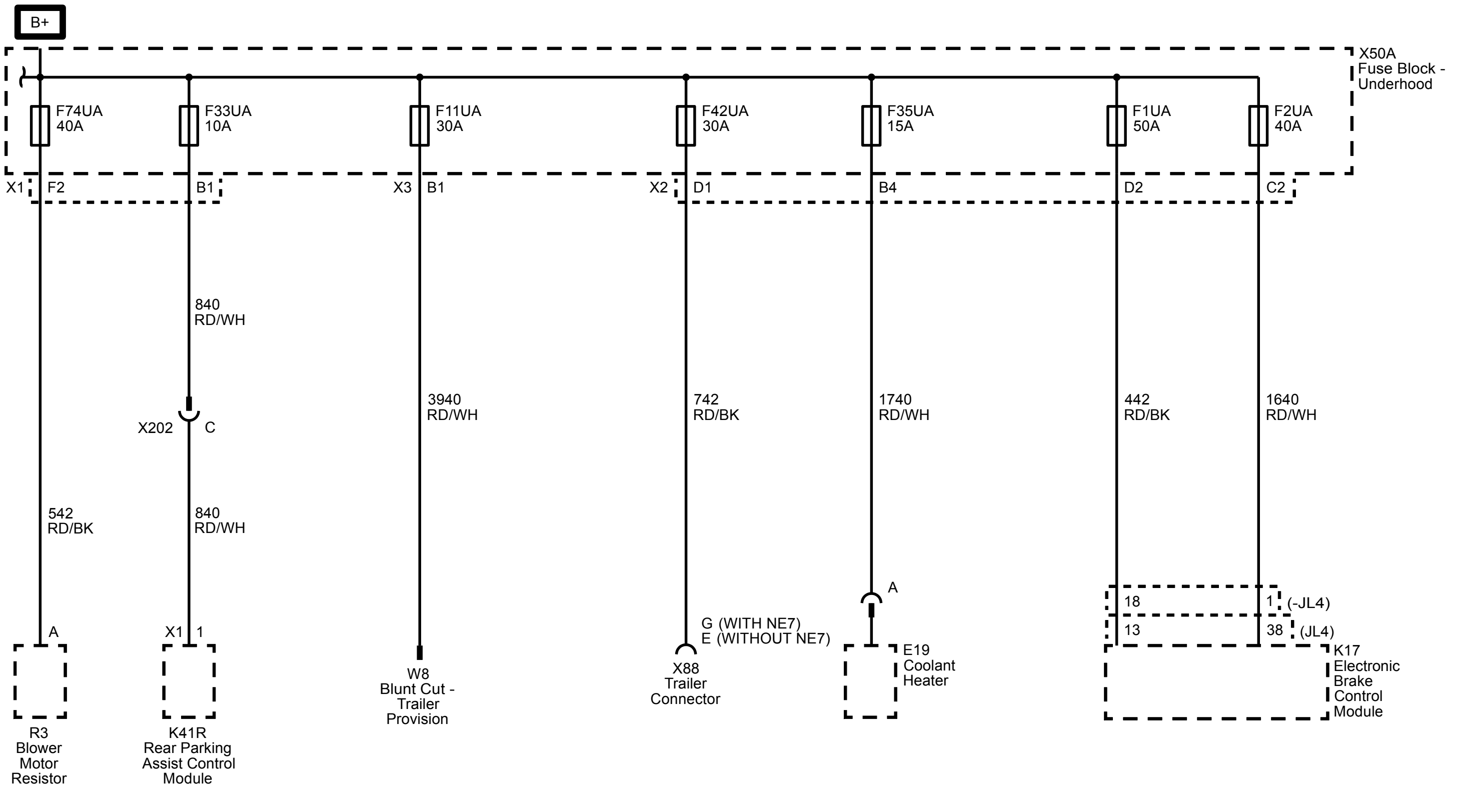
Fuses F7UA, F8UA, F9UA, F25UA, F26A, F58UA, F59UA, F72UA, and F73UA



B+
X50A
Fuse Block - Underhood
F9UA 10A
F7UA 10A
F72UA 10A
F26UA 10A
F59UA 10A
F58UA 15A
F8UA 10A
F73UA 20A
F25UA 20A
X3
A3
A7
J2
A4
H2
K3
A5
J1
G1
B4
640 RD/WH
640 RD/WH
1040 RD/WH
DT4
-DT4
2240 RD/WH
2740 RD/WH
2940 RD/WH
3040 RD/WH
3840 RD/WH
2140 RD/WH
2540 RD/WH
640 RD/WH
640 RD/WH
A
A
16
A
E32 Cigarette Lighter Receptacle
X80A Accessory Power Receptacle - Center Console 1
X84 Data Link Connector
X80B Accessory Power Receptacle - Center Console 2
X4
4
1
3
2
X3
3
2
X2
2
K9 Body Control Module

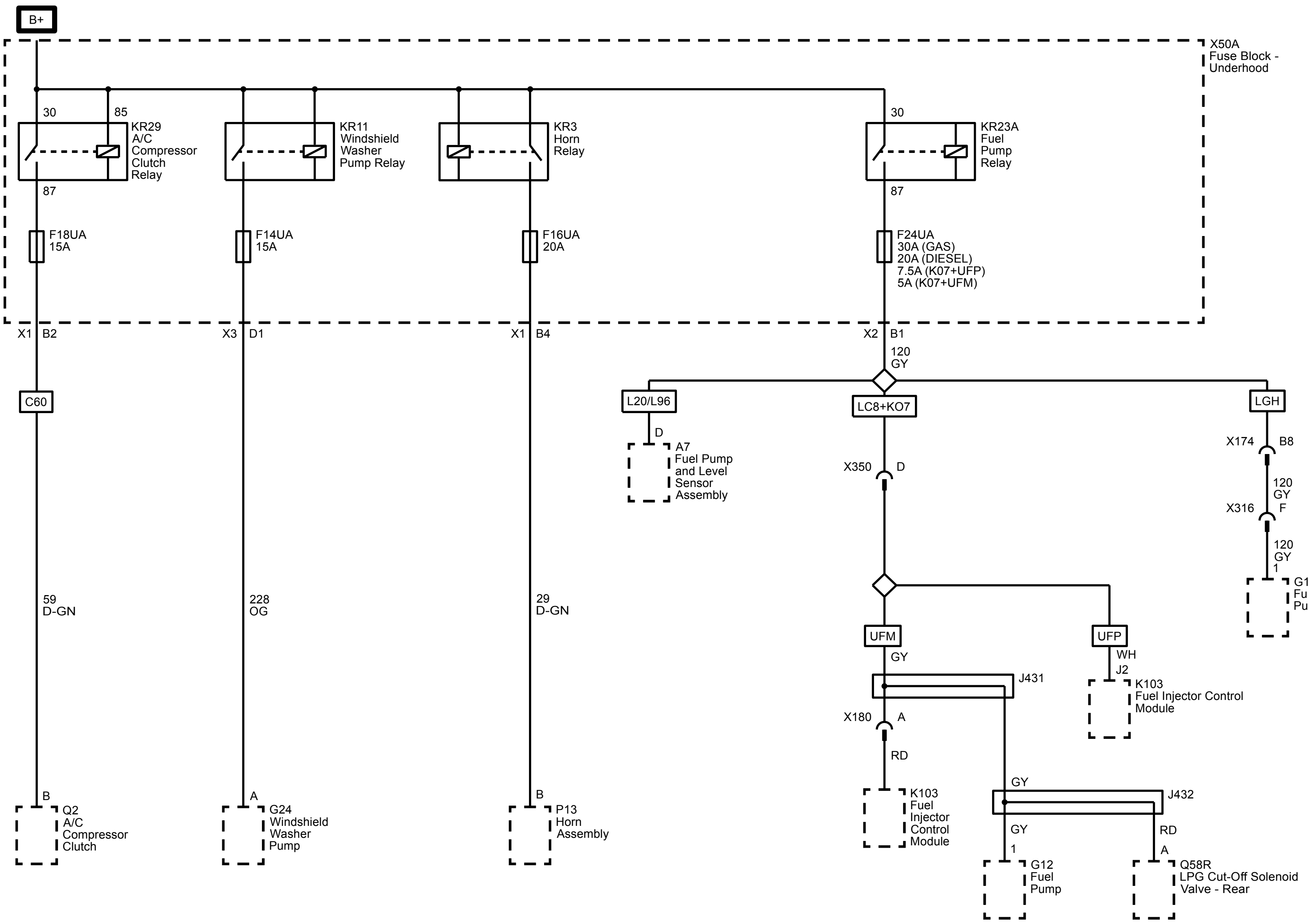
2017 CHEVROLET EXPRESS/GMC SAVANA
ELECTRICAL SECTION

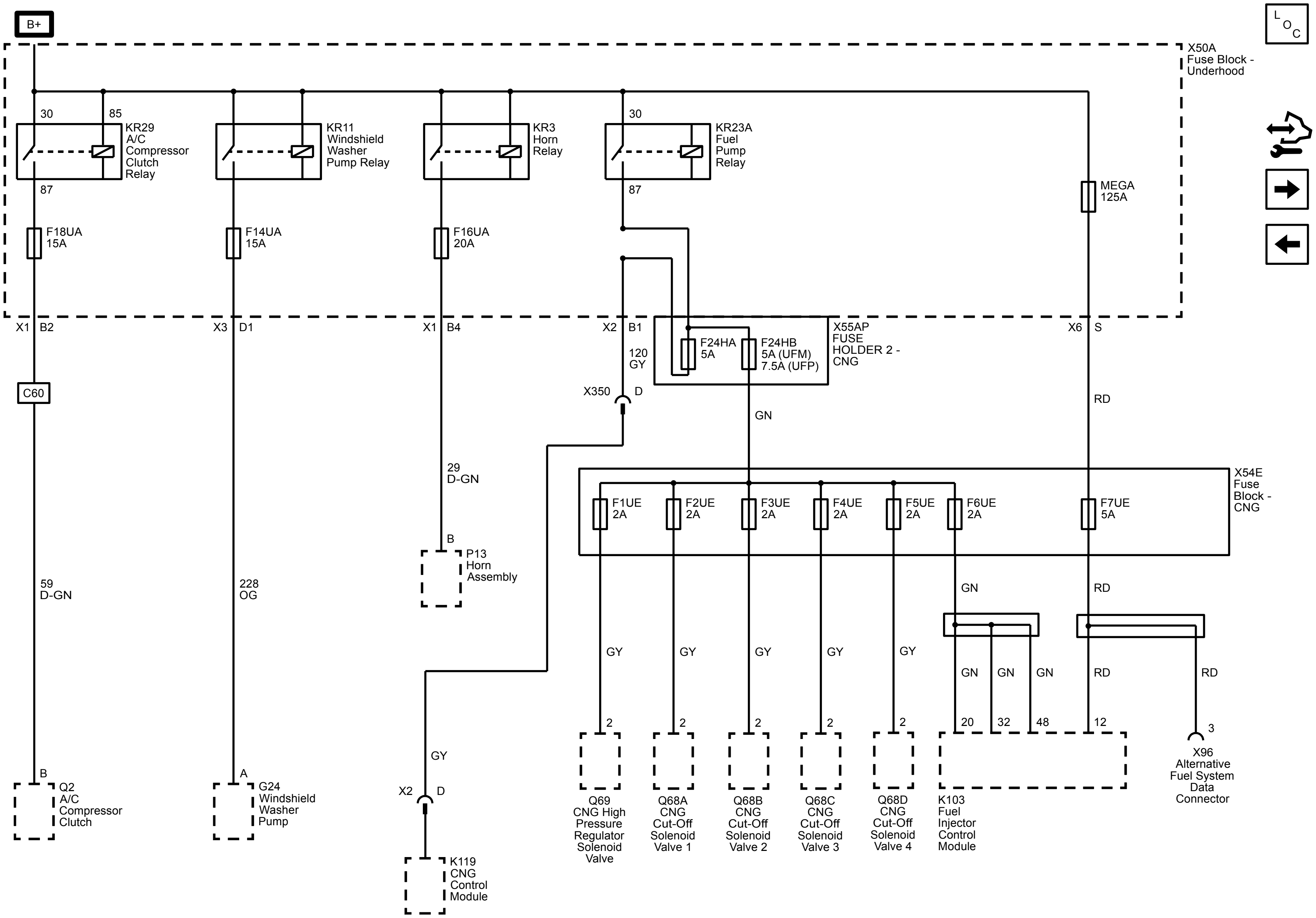
Fuses F1UA, F2UA, F11UA, F33UA, F35UA, F42UA, and F74UA



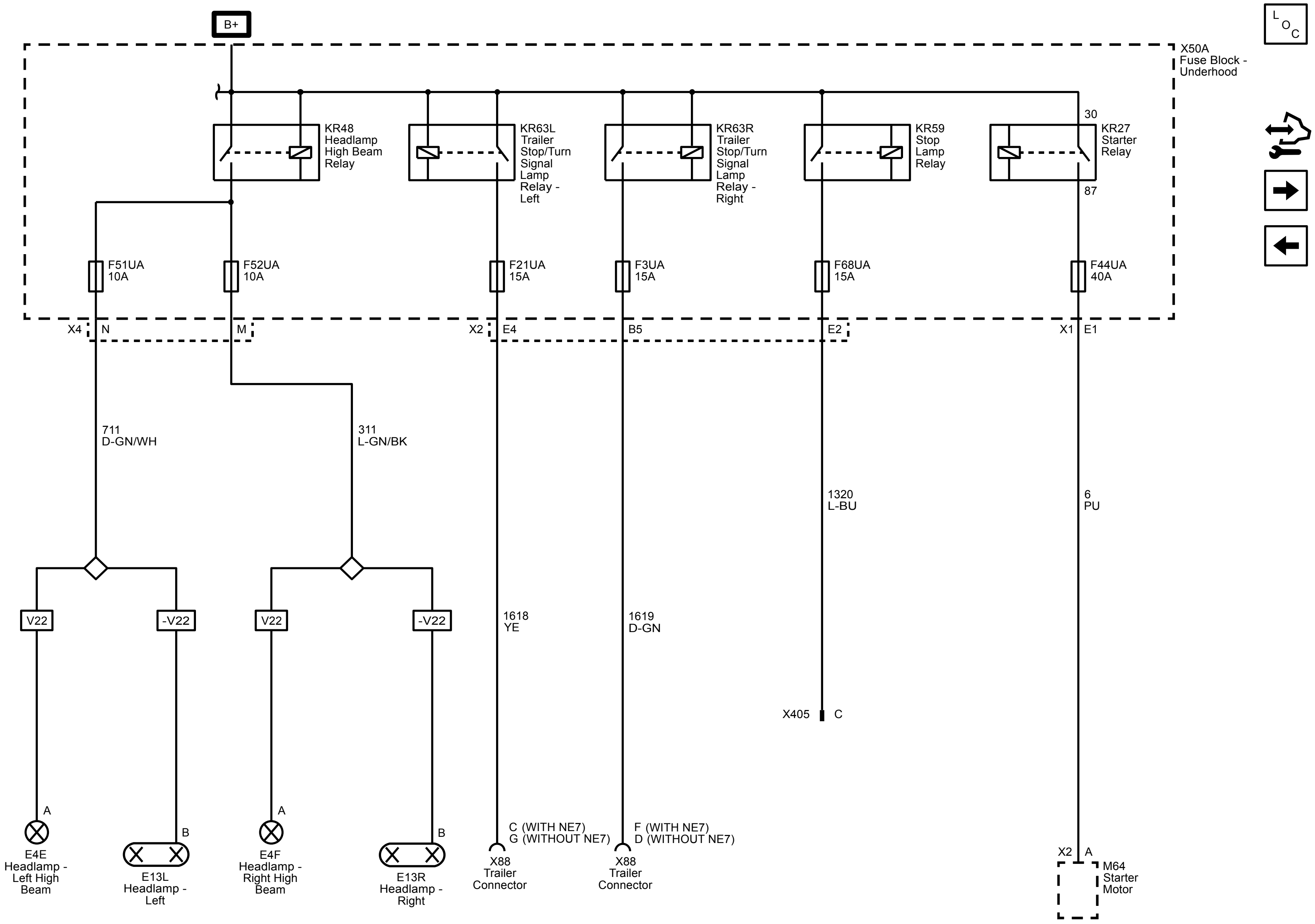
B+
X50A
Fuse Block - Underhood
F74UA
40A
F33UA
10A
F11UA
30A
F42UA
30A
F35UA
15A
F1UA
50A
F2UA
40A
X1
F2
B1
X3
B1
X2
D1
B4
D2
C2
840
RD/WH
X202
C
840
RD/WH
542
RD/BK
3940
RD/WH
742
RD/BK
1740
RD/WH
442
RD/BK
1640
RD/WH
A
X1
1
G (WITH NE7)
E (WITHOUT NE7)
A
18
1
(-JL4)
13
38
(JL4)
R3
Blower
Motor
Resistor
K41R
Rear Parking
Assist Control
Module
W8
Blunt Cut -
Trailer
Provision
X88
Trailer
Connector
E19
Coolant
Heater
K17
Electronic
Brake
Control
Module

Fuses F14UA, F16UA, F18UA, and F24UA (except FHZ)


B+
X50A
Fuse Block - Underhood
30
85
KR29
A/C Compressor Clutch Relay
87
KR11
Windshield Washer Pump Relay
KR3
Horn Relay
30
KR23A
Fuel Pump Relay
87
F18UA
15A
F14UA
15A
F16UA
20A
F24UA
30A (GAS)
20A (DIESEL)
7.5A (K07+UFP)
5A (K07+UFM)
X1 B2
X3 D1
X1 B4
X2 B1
120
GY
C60
L20/L96
LC8+KO7
LGH
D
A7
Fuel Pump and Level Sensor Assembly
X350 D
X174 B8
120
GY
X316 F
120
GY
1
G12
Fuel Pump
59
D-GN
228
OG
29
D-GN
UFM
UFP
GY
WH
J2
J431
K103
Fuel Injector Control Module
X180 A
RD
GY
J432
GY
RD
1
A
K103
Fuel Injector Control Module
G12
Fuel Pump
Q58R
LPG Cut-Off Solenoid Valve - Rear
B
Q2
A/C Compressor Clutch
A
G24
Windshield Washer Pump
B
P13
Horn Assembly
LOC

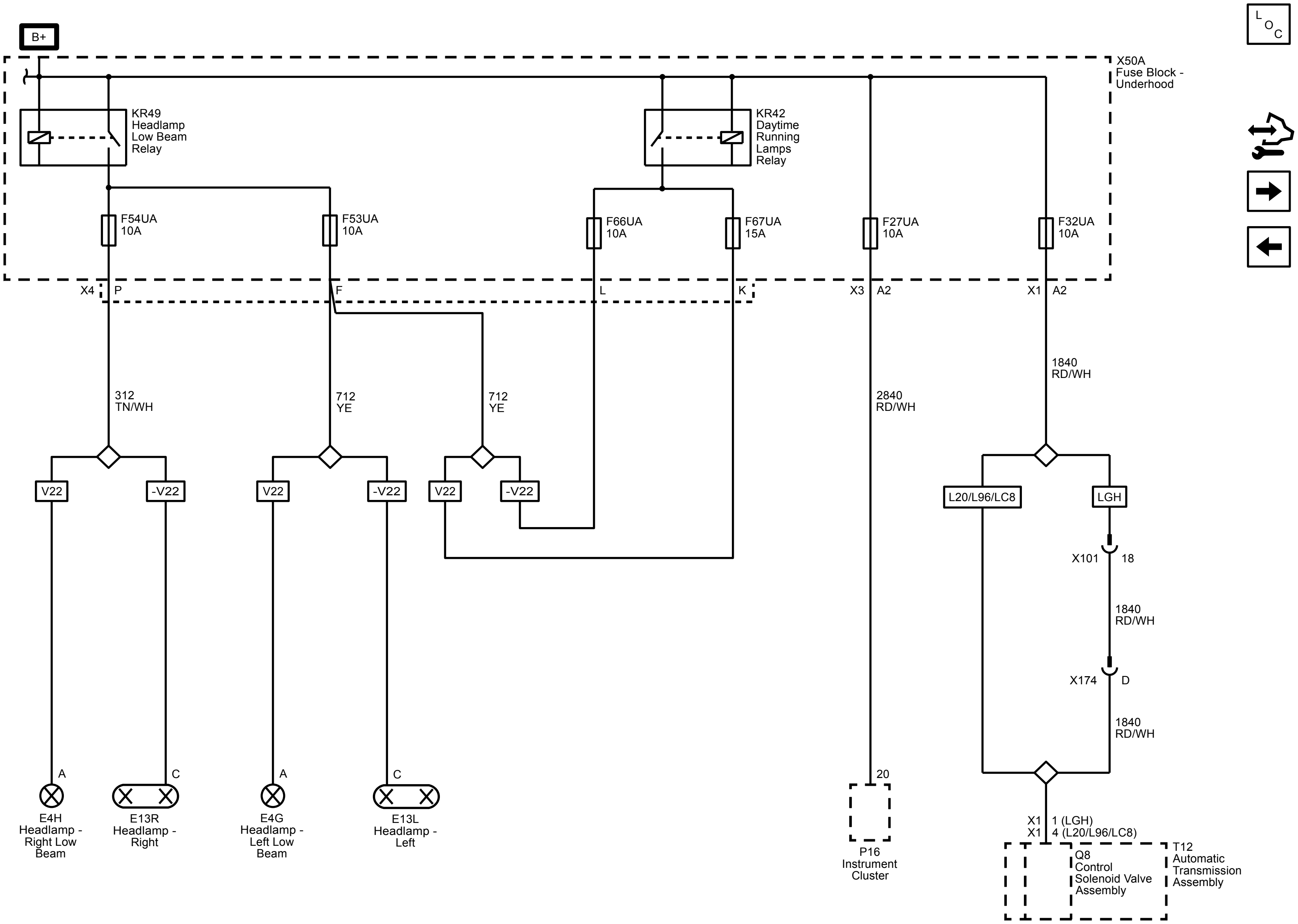

B+
X50A Fuse Block - Underhood
30
85
KR29 A/C Compressor Clutch Relay
87
KR11 Windshield Washer Pump Relay
KR3 Horn Relay
30
KR23A Fuel Pump Relay
87
MEGA 125A
F18UA 15A
F14UA 15A
F16UA 20A
X1 B2
X3 D1
X1 B4
X2 B1
X6 S
X55AP FUSE HOLDER 2 - CNG
F24HA 5A
F24HB 5A (UFM) 7.5A (UFP)
120 GY
X350 D
GN
RD
C60
29 D-GN
X54E Fuse Block - CNG
F1UE 2A
F2UE 2A
F3UE 2A
F4UE 2A
F5UE 2A
F6UE 2A
F7UE 5A
B
P13 Horn Assembly
59 D-GN
228 OG
GN
RD
GY
GY
GY
GY
GY
GN
GN
GN
RD
RD
2
2
2
2
2
20
32
48
12
3
GY
B
A
Q2 A/C Compressor Clutch
G24 Windshield Washer Pump
X2 D
K119 CNG Control Module
Q69 CNG High Pressure Regulator Solenoid Valve
Q68A CNG Cut-Off Solenoid Valve 1
Q68B CNG Cut-Off Solenoid Valve 2
Q68C CNG Cut-Off Solenoid Valve 3
Q68D CNG Cut-Off Solenoid Valve 4
K103 Fuel Injector Control Module
X96 Alternative Fuel System Data Connector
L O C

Fuses F3UA, F21UA, F44UA, F51UA, F52UA, and F68UA

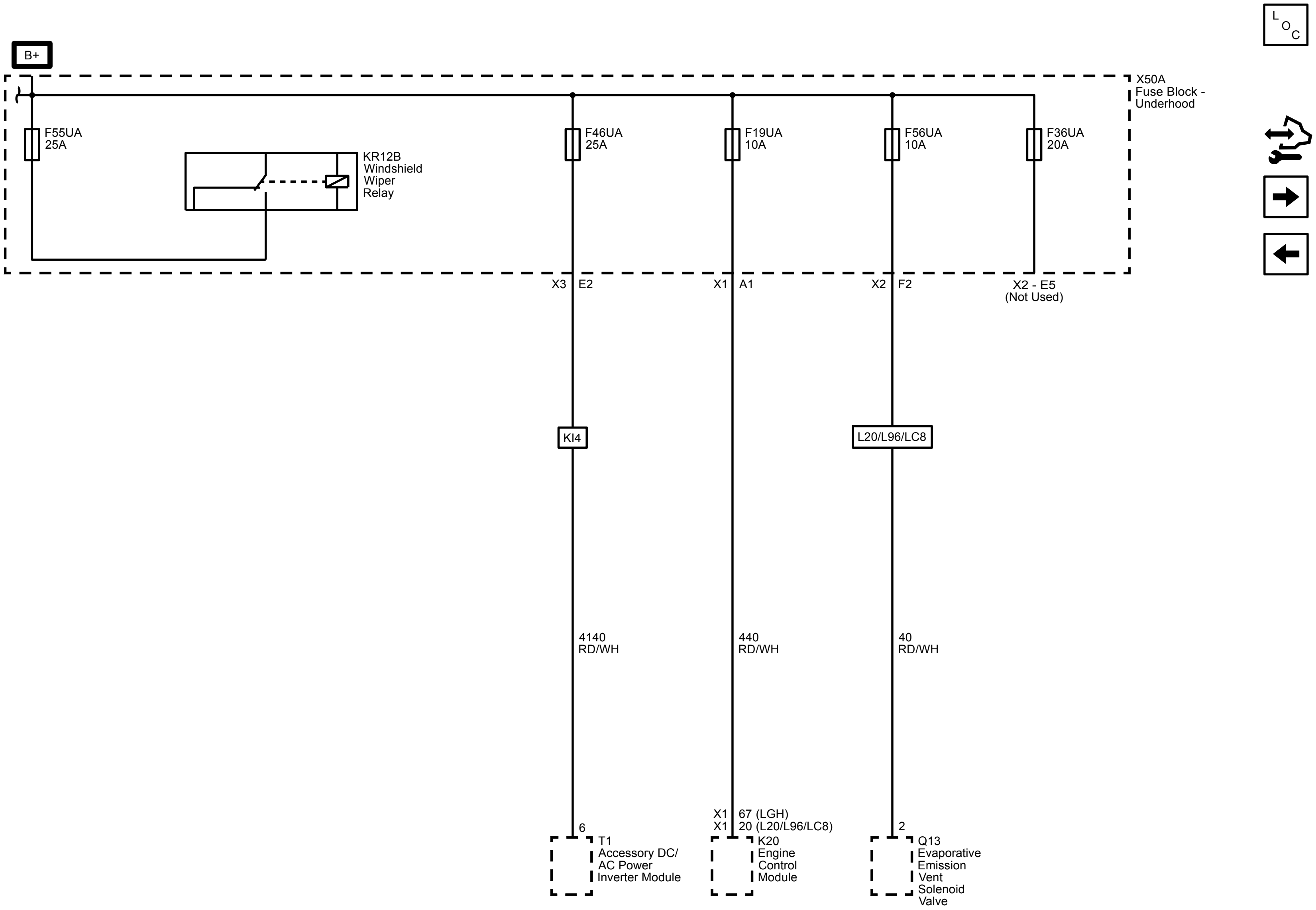

B+
X50A Fuse Block - Underhood
LOC
KR48 Headlamp High Beam Relay
KR63L Trailer Stop/Turn Signal Lamp Relay - Left
KR63R Trailer Stop/Turn Signal Lamp Relay - Right
KR59 Stop Lamp Relay
30
KR27 Starter Relay
87
F51UA 10A
F52UA 10A
F21UA 15A
F3UA 15A
F68UA 15A
F44UA 40A
X4
N
M
X2
E4
B5
E2
X1
E1
711 D-GN/WH
311 L-GN/BK
1320 L-BU
6 PU
V22
-V22
V22
-V22
1618 YE
1619 D-GN
X405
C
A
B
A
B
E4E Headlamp - Left High Beam
E13L Headlamp - Left
E4F Headlamp - Right High Beam
E13R Headlamp - Right
C (WITH NE7)
G (WITHOUT NE7)
X88 Trailer Connector
F (WITH NE7)
D (WITHOUT NE7)
X88 Trailer Connector
X2
A
M64 Starter Motor

2017 CHEVROLET EXPRESS/GMC SAVANA
ELECTRICAL SECTION

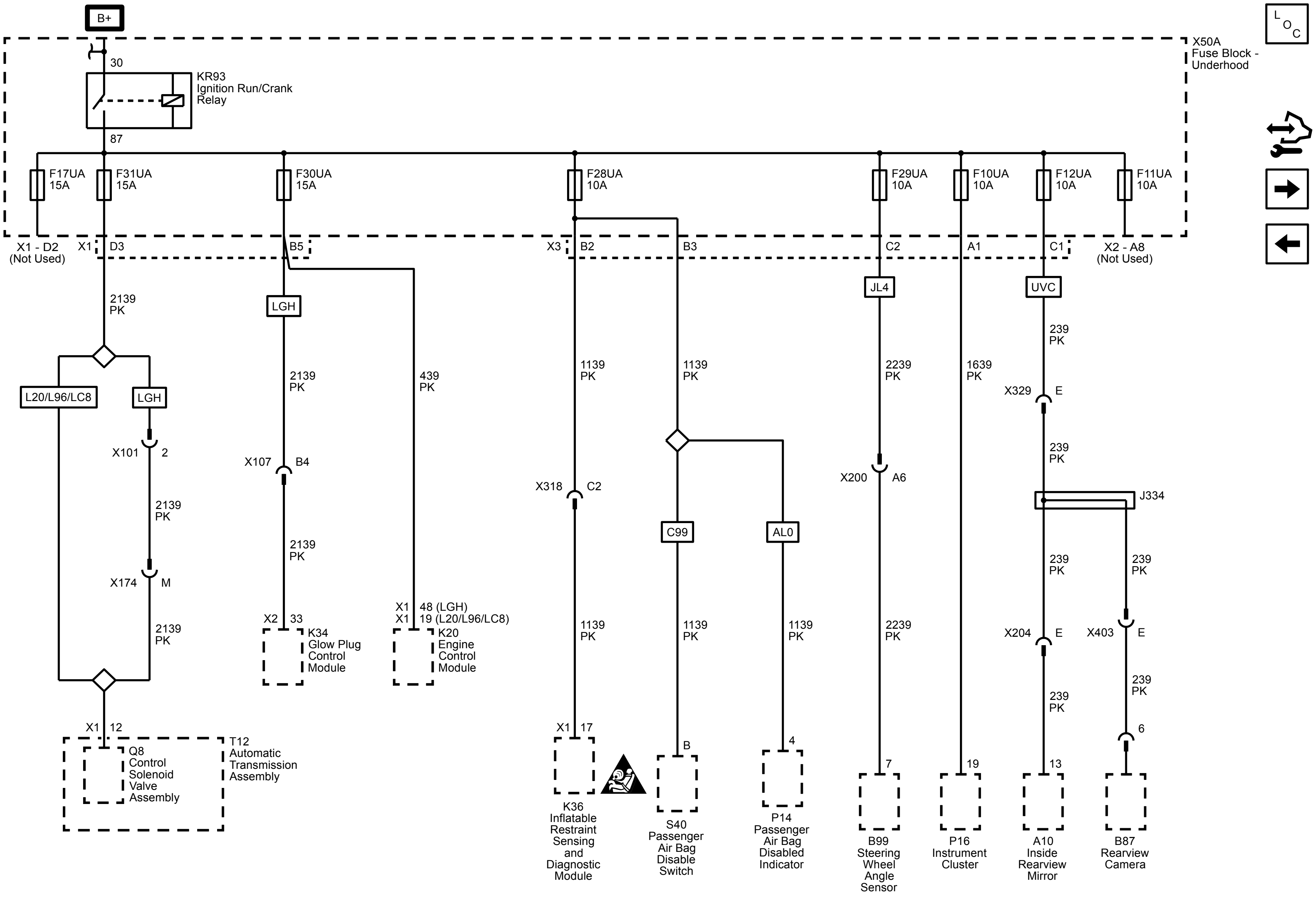
Fuses F27UA, F32UA, F53UA, F54UA, F66UA, and F67UA



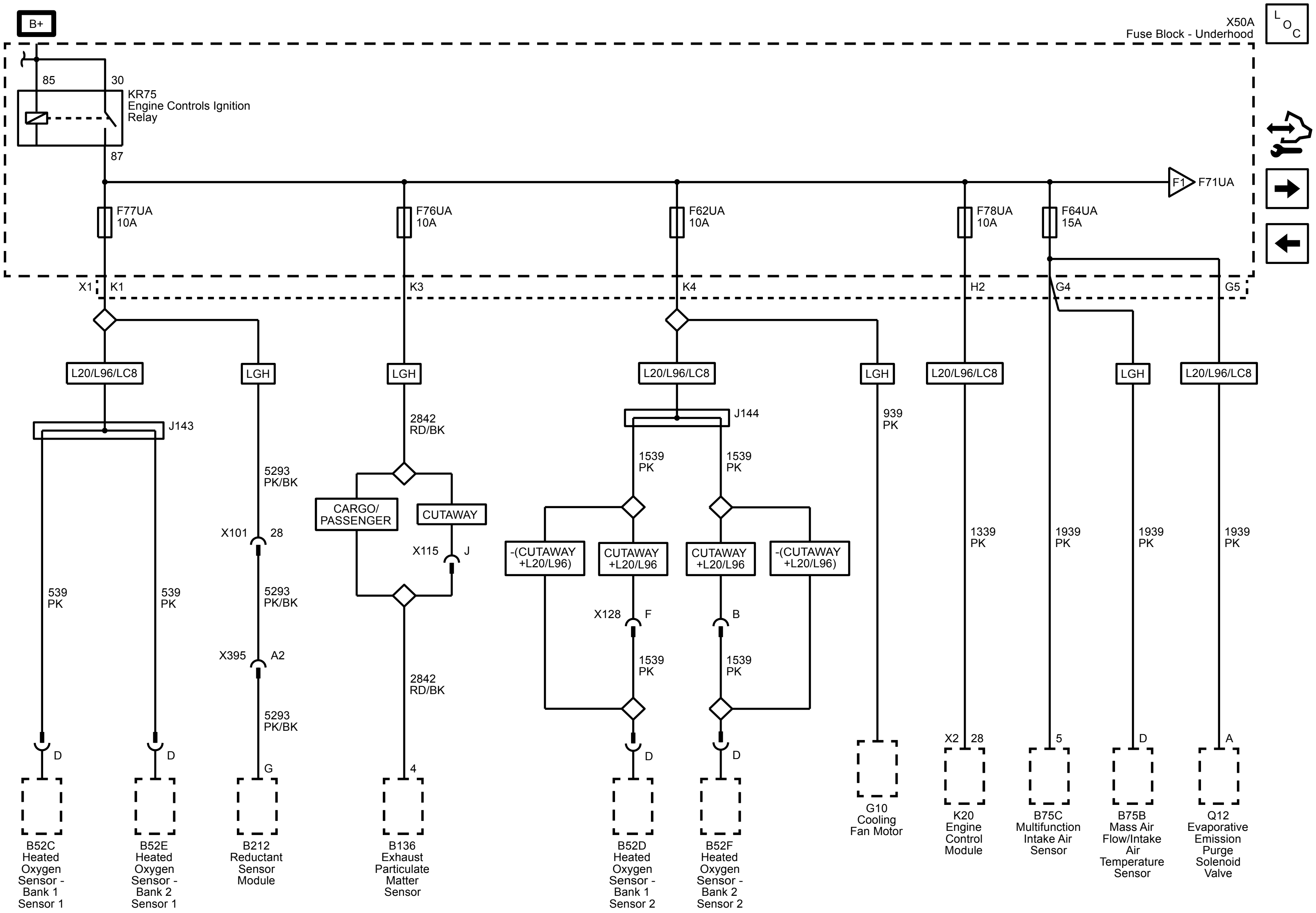
LOC
B+
X50A
Fuse Block -
Underhood
KR49
Headlamp
Low Beam
Relay
KR42
Daytime
Running
Lamps
Relay
F54UA
10A
F53UA
10A
F66UA
10A
F67UA
15A
F27UA
10A
F32UA
10A
X4
P
F
L
K
X3
A2
X1
A2
312
TN/WH
712
YE
712
YE
2840
RD/WH
1840
RD/WH
V22
-V22
V22
-V22
V22
-V22
L20/L96/LC8
LGH
X101
18
1840
RD/WH
X174
D
1840
RD/WH
A
C
A
C
20
E4H
Headlamp -
Right Low
Beam
E13R
Headlamp -
Right
E4G
Headlamp -
Left Low
Beam
E13L
Headlamp -
Left
P16
Instrument
Cluster
X1
X1
1 (LGH)
4 (L20/L96/LC8)
Q8
Control
Solenoid Valve
Assembly
T12
Automatic
Transmission
Assembly


B+
X50A
Fuse Block -
Underhood
L O C
F55UA
25A
KR12B
Windshield
Wiper
Relay
F46UA
25A
F19UA
10A
F56UA
10A
F36UA
20A
X3 E2
X1 A1
X2 F2
X2 - E5
(Not Used)
KI4
L20/L96/LC8
4140
RD/WH
440
RD/WH
40
RD/WH
6
T1
Accessory DC/
AC Power
Inverter Module
X1 67 (LGH)
X1 20 (L20/L96/LC8)
K20
Engine
Control
Module
2
Q13
Evaporative
Emission
Vent
Solenoid
Valve

Fuses F10UA, F11UA, F12UA, F17UA, F28UA, F29UA, F30UA, and F31UA

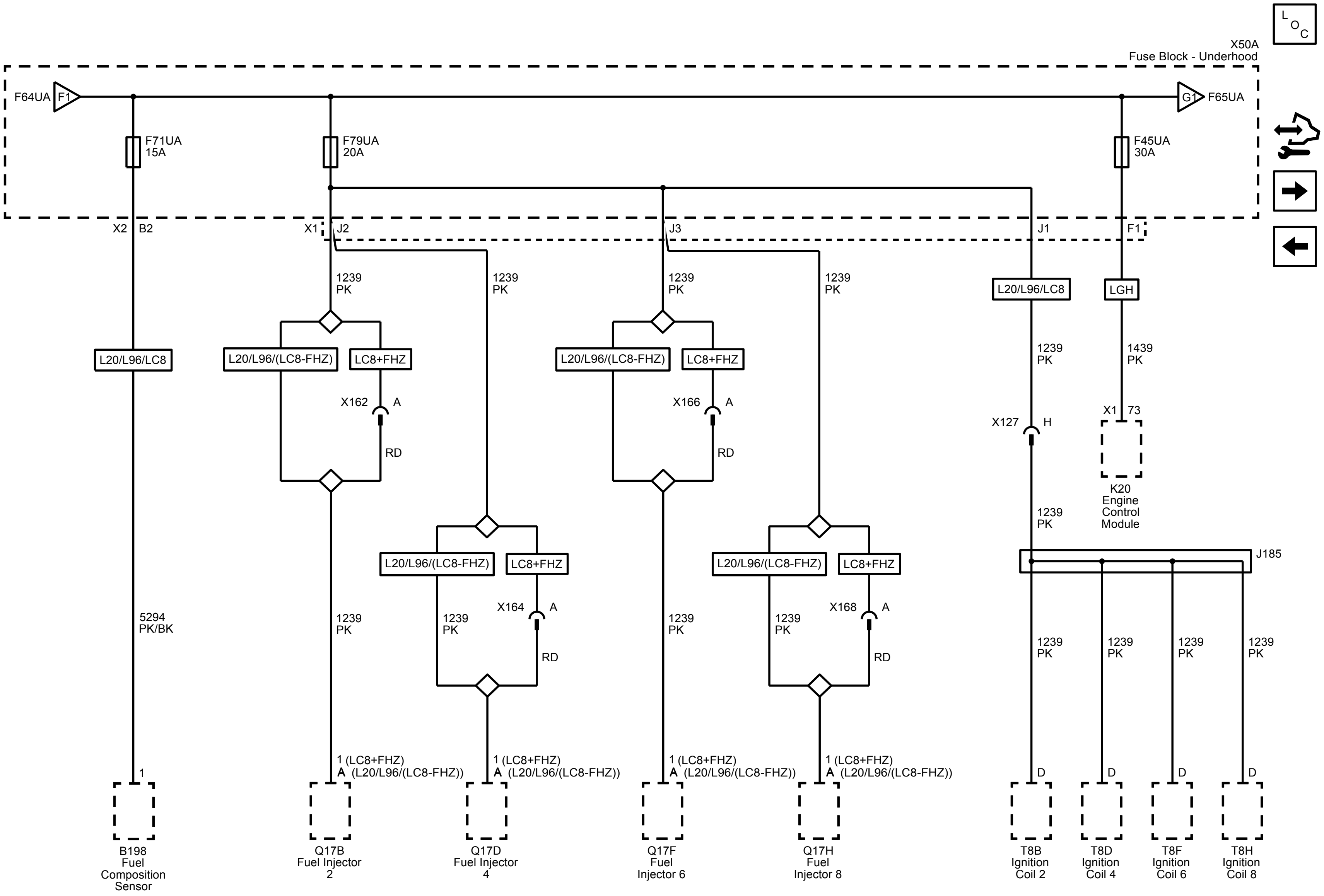

B+
30
KR93
Ignition Run/Crank
Relay
87
X50A
Fuse Block -
Underhood
F17UA 15A
F31UA 15A
F30UA 15A
F28UA 10A
F29UA 10A
F10UA 10A
F12UA 10A
F11UA 10A
X1 - D2
(Not Used)
X1 D3
B5
X3 B2
B3
C2
A1
C1
X2 - A8
(Not Used)
2139 PK
L20/L96/LC8
LGH
X101 2
X174 M
X1 12
Q8
Control
Solenoid
Valve
Assembly
T12
Automatic
Transmission
Assembly
2139 PK
X107 B4
X2 33
K34
Glow Plug
Control
Module
439 PK
X1 48 (LGH)
X1 19 (L20/L96/LC8)
K20
Engine
Control
Module
1139 PK
X318 C2
X1 17
K36
Inflatable
Restraint
Sensing
and
Diagnostic
Module
C99
AL0
B
S40
Passenger
Air Bag
Disable
Switch
4
P14
Passenger
Air Bag
Disabled
Indicator
JL4
2239 PK
X200 A6
7
B99
Steering
Wheel
Angle
Sensor
1639 PK
19
P16
Instrument
Cluster
UVC
239 PK
X329 E
J334
X204 E
13
A10
Inside
Rearview
Mirror
X403 E
6
B87
Rearview
Camera
L
O
C

Fuses F62UA, F64UA, F76UA, F77UA, and F78UA



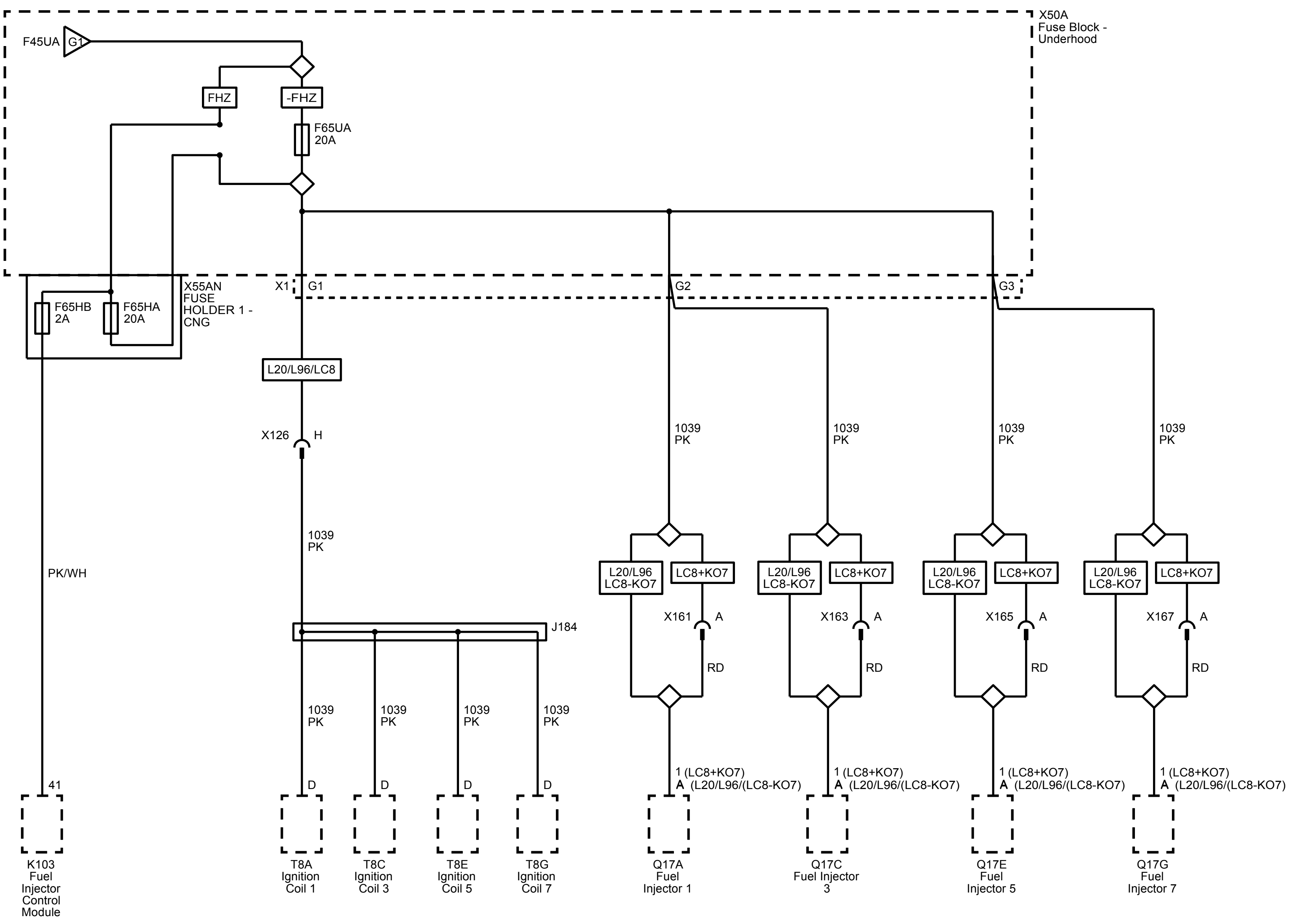
B+
X50A
Fuse Block - Underhood
L O C
85
30
KR75
Engine Controls Ignition
Relay
87
F77UA
10A
F76UA
10A
F62UA
10A
F78UA
10A
F64UA
15A
F1
F71UA
X1
K1
K3
K4
H2
G4
G5
L20/L96/LC8
LGH
LGH
L20/L96/LC8
LGH
L20/L96/LC8
LGH
L20/L96/LC8
J143
J144
2842
RD/BK
1539
PK
1539
PK
939
PK
5293
PK/BK
CARGO/
PASSENGER
CUTAWAY
X101
28
X115
J
-(CUTAWAY
+L20/L96)
CUTAWAY
+L20/L96
CUTAWAY
+L20/L96
-(CUTAWAY
+L20/L96)
1339
PK
1939
PK
1939
PK
1939
PK
539
PK
539
PK
5293
PK/BK
X128
F
B
X395
A2
1539
PK
1539
PK
2842
RD/BK
5293
PK/BK
X2
28
5
D
A
D
D
G
4
D
D
G10
Cooling
Fan Motor
K20
Engine
Control
Module
B75C
Multifunction
Intake Air
Sensor
B75B
Mass Air
Flow/Intake
Air
Temperature
Sensor
Q12
Evaporative
Emission
Purge
Solenoid
Valve
B52C
Heated
Oxygen
Sensor -
Bank 1
Sensor 1
B52E
Heated
Oxygen
Sensor -
Bank 2
Sensor 1
B212
Reductant
Sensor
Module
B136
Exhaust
Particulate
Matter
Sensor
B52D
Heated
Oxygen
Sensor -
Bank 1
Sensor 2
B52F
Heated
Oxygen
Sensor -
Bank 2
Sensor 2

Fuses F45UA, F71UA, and F79UA

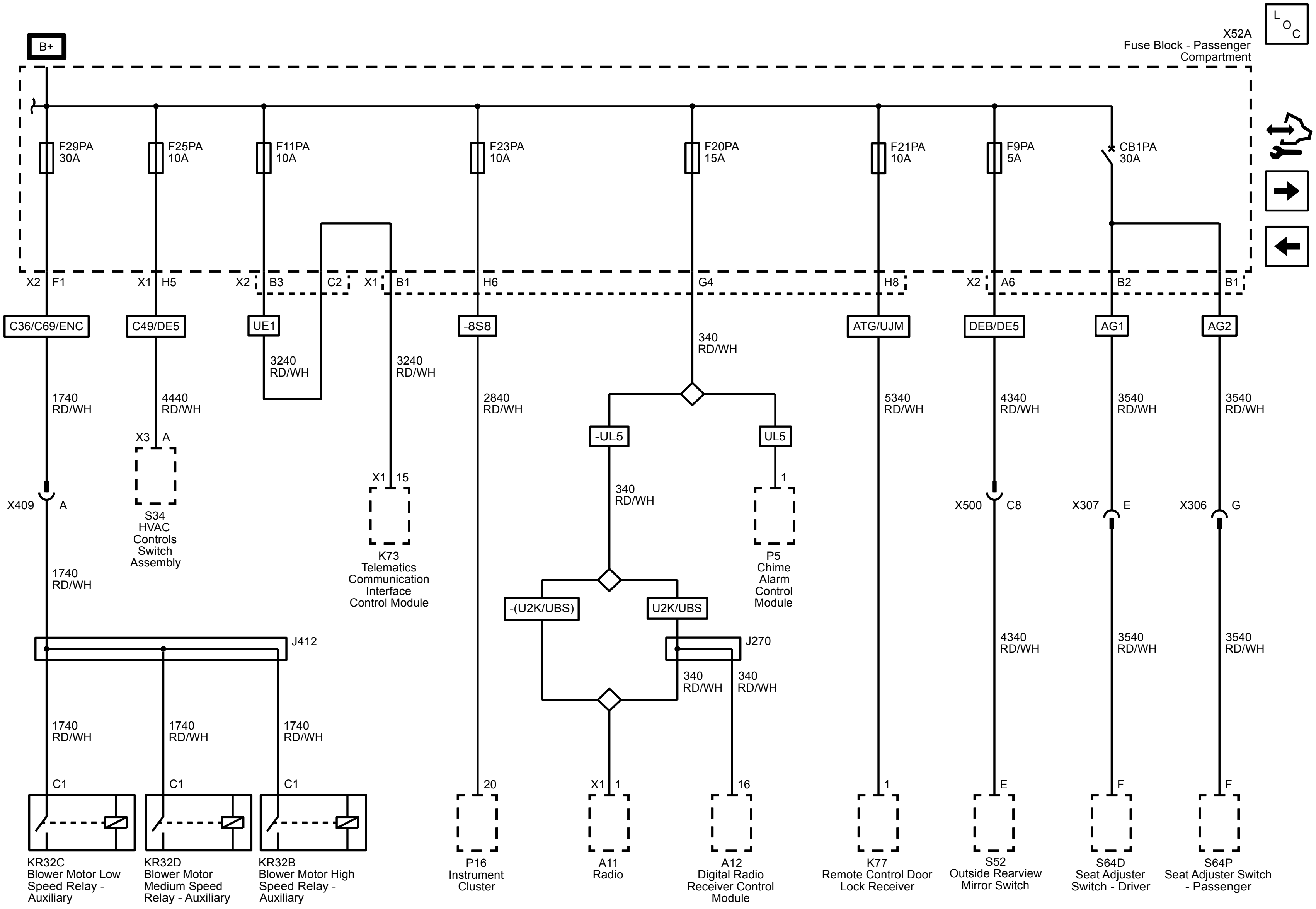


X50A
Fuse Block - Underhood
F64UA
F1
G1
F65UA
F71UA
15A
F79UA
20A
F45UA
30A
X2
B2
X1
J2
J3
J1
F1
1239
PK
L20/L96/LC8
L20/L96/(LC8-FHZ)
LC8+FHZ
LGH
1439
PK
X162
A
RD
X164
X166
X168
X127
H
X1
73
K20
Engine
Control
Module
J185
5294
PK/BK
1
1 (LC8+FHZ)
A (L20/L96/(LC8-FHZ))
D
B198
Fuel
Composition
Sensor
Q17B
Fuel Injector
2
Q17D
Fuel Injector
4
Q17F
Fuel
Injector 6
Q17H
Fuel
Injector 8
T8B
Ignition
Coil 2
T8D
Ignition
Coil 4
T8F
Ignition
Coil 6
T8H
Ignition
Coil 8
L
O
C

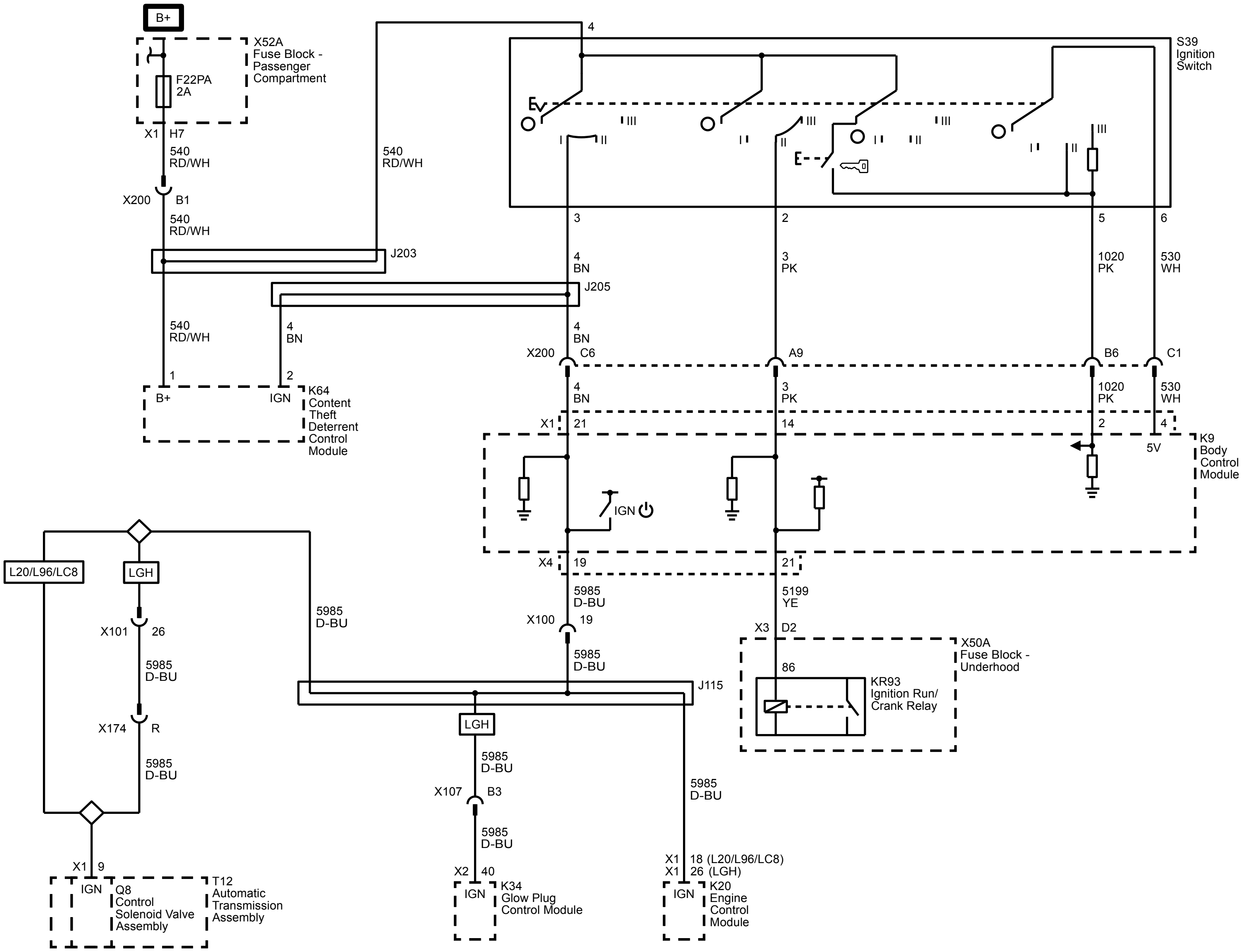
Fuse F65UA


X50A
Fuse Block - Underhood
F45UA
G1
FHZ
-FHZ
F65UA
20A
X55AN
FUSE
HOLDER 1 -
CNG
F65HB
2A
F65HA
20A
X1
G1
G2
G3
L20/L96/LC8
X126
H
1039
PK
PK/WH
J184
1039
PK
1039
PK
1039
PK
1039
PK
1039
PK
1039
PK
1039
PK
1039
PK
L20/L96
LC8-KO7
LC8+KO7
X161
A
RD
X163
A
RD
X165
A
RD
X167
A
RD
41
D
D
D
D
1 (LC8+KO7)
A (L20/L96/(LC8-KO7)
1 (LC8+KO7)
A (L20/L96/(LC8-KO7)
1 (LC8+KO7)
A (L20/L96/(LC8-KO7)
1 (LC8+KO7)
A (L20/L96/(LC8-KO7)
K103
Fuel
Injector
Control
Module
T8A
Ignition
Coil 1
T8C
Ignition
Coil 3
T8E
Ignition
Coil 5
T8G
Ignition
Coil 7
Q17A
Fuel
Injector 1
Q17C
Fuel Injector
3
Q17E
Fuel
Injector 5
Q17G
Fuel
Injector 7

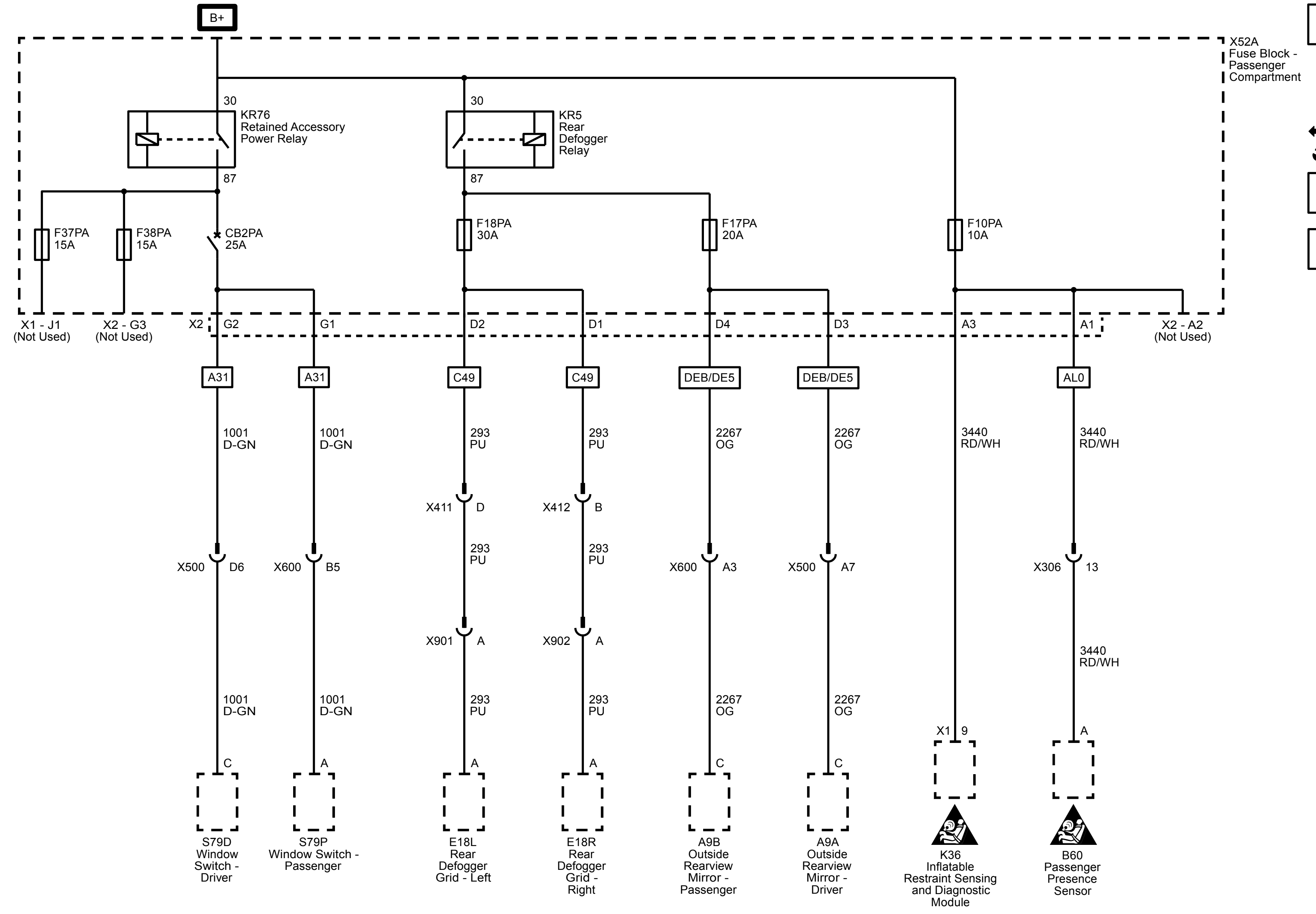
Fuses F9PA, F11PA, F20PA, F21PA, F23PA, F25PA, F29PA, and Circuit Breaker CB1PA


B+
X52A
Fuse Block - Passenger Compartment
F29PA 30A
F25PA 10A
F11PA 10A
F23PA 10A
F20PA 15A
F21PA 10A
F9PA 5A
CB1PA 30A
X2 F1
X1 H5
X2 B3
C2
X1 B1
H6
G4
H8
X2 A6
B2
B1
C36/C69/ENC
C49/DE5
UE1
-8S8
ATG/UJM
DEB/DE5
AG1
AG2
1740 RD/WH
4440 RD/WH
3240 RD/WH
3240 RD/WH
2840 RD/WH
340 RD/WH
5340 RD/WH
4340 RD/WH
3540 RD/WH
3540 RD/WH
-UL5
UL5
X3 A
S34 HVAC Controls Switch Assembly
X1 15
K73 Telematics Communication Interface Control Module
1
P5 Chime Alarm Control Module
X409 A
X500 C8
X307 E
X306 G
-(U2K/UBS)
U2K/UBS
J412
J270
1740 RD/WH
340 RD/WH
340 RD/WH
4340 RD/WH
3540 RD/WH
3540 RD/WH
C1
C1
C1
20
X1 1
16
1
E
F
F
KR32C Blower Motor Low Speed Relay - Auxiliary
KR32D Blower Motor Medium Speed Relay - Auxiliary
KR32B Blower Motor High Speed Relay - Auxiliary
P16 Instrument Cluster
A11 Radio
A12 Digital Radio Receiver Control Module
K77 Remote Control Door Lock Receiver
S52 Outside Rearview Mirror Switch
S64D Seat Adjuster Switch - Driver
S64P Seat Adjuster Switch - Passenger
L O C

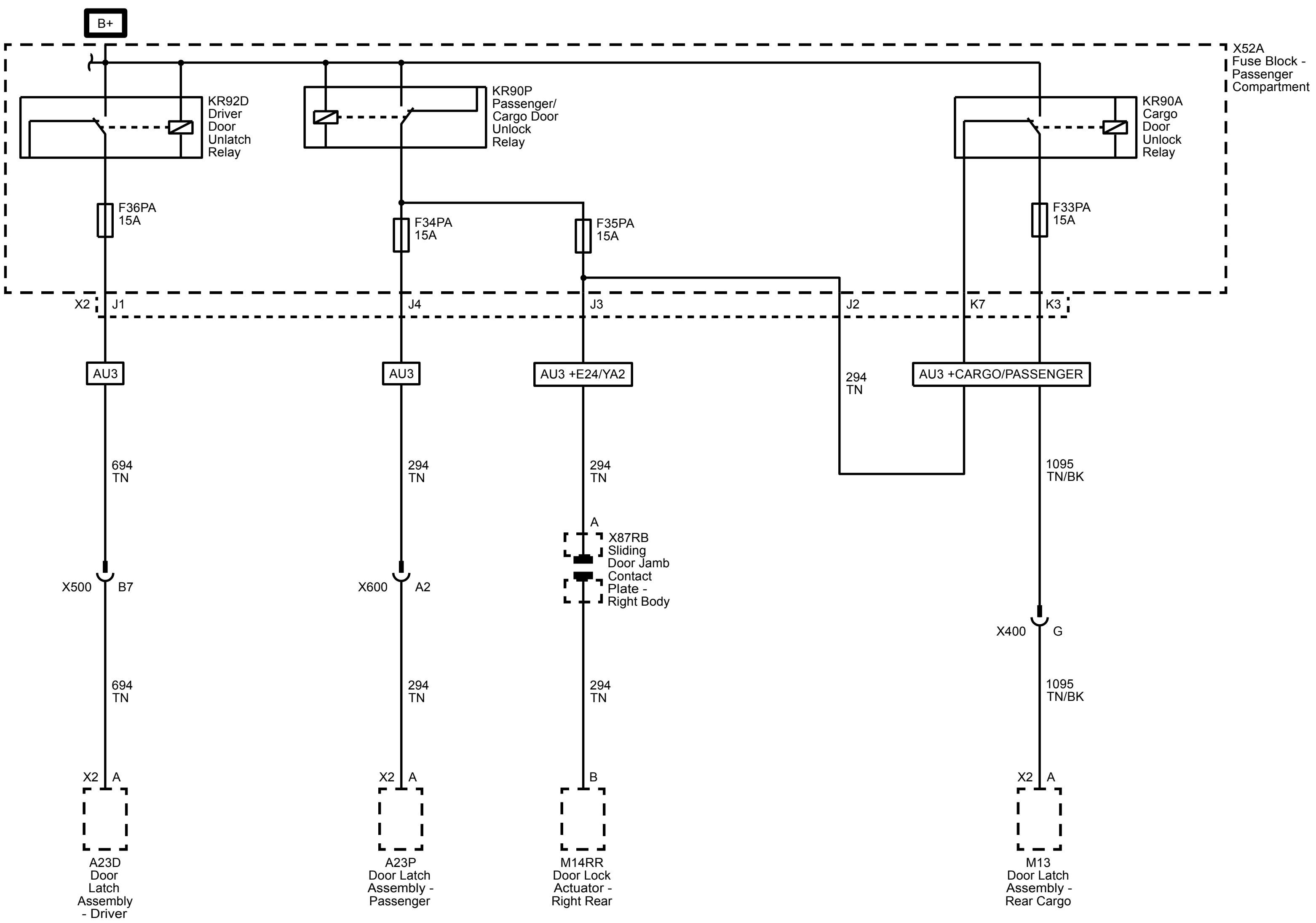
Ignition Switch and Fuse F22PA


B+
X52A Fuse Block - Passenger Compartment
F22PA 2A
X1 H7
540 RD/WH
X200 B1
540 RD/WH
J203
540 RD/WH
4 BN
1 B+
2 IGN
K64 Content Theft Deterrent Control Module
540 RD/WH
4
S39 Ignition Switch
III
II
I
3
2
5
6
4 BN
3 PK
1020 PK
530 WH
J205
4 BN
X200 C6
A9
B6
C1
4 BN
3 PK
1020 PK
530 WH
X1 21
14
2
4
5V
K9 Body Control Module
IGN
X4 19
21
5985 D-BU
5199 YE
X100 19
5985 D-BU
X3 D2
X50A Fuse Block - Underhood
86
KR93 Ignition Run/ Crank Relay
J115
L20/L96/LC8
LGH
X101 26
5985 D-BU
X174 R
5985 D-BU
5985 D-BU
LGH
5985 D-BU
X107 B3
5985 D-BU
5985 D-BU
X1 9
IGN
Q8 Control Solenoid Valve Assembly
T12 Automatic Transmission Assembly
X2 40
IGN
K34 Glow Plug Control Module
X1 18 (L20/L96/LC8)
X1 26 (LGH)
IGN
K20 Engine Control Module

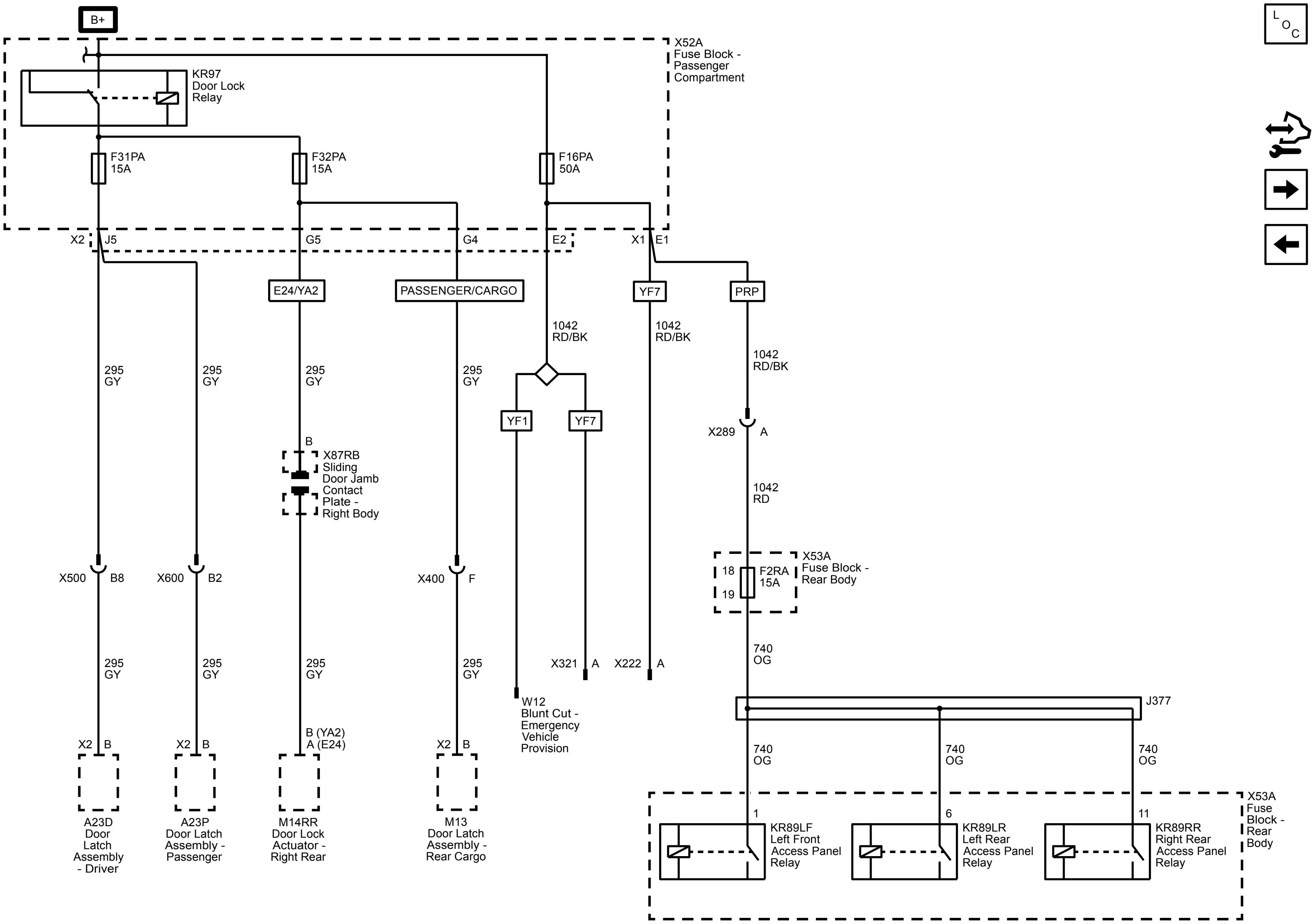
Fuses F10PA, F17PA, F18PA, F37PA, F38PA, and Circuit Breaker CB2PA


B+
X52A
Fuse Block -
Passenger
Compartment
30
KR76
Retained Accessory
Power Relay
87
30
KR5
Rear
Defogger
Relay
87
F37PA
15A
F38PA
15A
CB2PA
25A
F18PA
30A
F17PA
20A
F10PA
10A
X1 - J1
(Not Used)
X2 - G3
(Not Used)
X2
G2
G1
D2
D1
D4
D3
A3
A1
X2 - A2
(Not Used)
A31
A31
C49
C49
DEB/DE5
DEB/DE5
AL0
1001
D-GN
1001
D-GN
293
PU
293
PU
2267
OG
2267
OG
3440
RD/WH
3440
RD/WH
X411
D
X412
B
293
PU
293
PU
X500
D6
X600
B5
X600
A3
X500
A7
X306
13
X901
A
X902
A
3440
RD/WH
1001
D-GN
1001
D-GN
293
PU
293
PU
2267
OG
2267
OG
X1
9
A
C
A
A
A
C
C
S79D
Window
Switch -
Driver
S79P
Window Switch -
Passenger
E18L
Rear
Defogger
Grid - Left
E18R
Rear
Defogger
Grid -
Right
A9B
Outside
Rearview
Mirror -
Passenger
A9A
Outside
Rearview
Mirror -
Driver
K36
Inflatable
Restraint Sensing
and Diagnostic
Module
B60
Passenger
Presence
Sensor

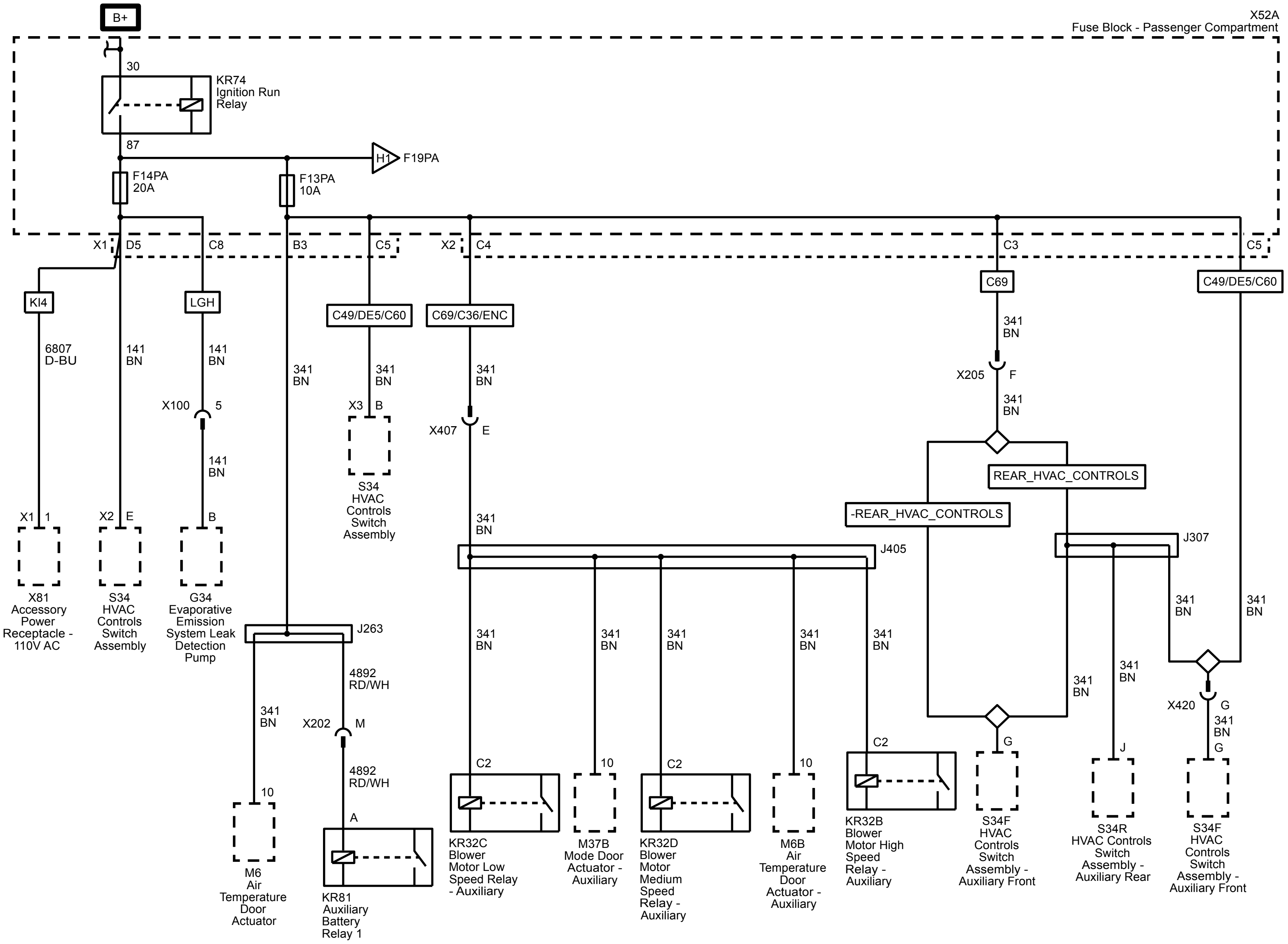
Fuses F33PA, F34PA, F35PA, and F36PA


B+
X52A
Fuse Block -
Passenger
Compartment
KR92D
Driver
Door
Unlatch
Relay
KR90P
Passenger/
Cargo Door
Unlock
Relay
KR90A
Cargo
Door
Unlock
Relay
F36PA
15A
F34PA
15A
F35PA
15A
F33PA
15A
X2
J1
J4
J3
J2
K7
K3
AU3
AU3
AU3 +E24/YA2
AU3 +CARGO/PASSENGER
294
TN
694
TN
294
TN
294
TN
1095
TN/BK
A
X87RB
Sliding
Door Jamb
Contact
Plate -
Right Body
X500
B7
X600
A2
X400
G
694
TN
294
TN
294
TN
1095
TN/BK
X2
A
X2
A
B
X2
A
A23D
Door
Latch
Assembly
- Driver
A23P
Door Latch
Assembly -
Passenger
M14RR
Door Lock
Actuator -
Right Rear
M13
Door Latch
Assembly -
Rear Cargo

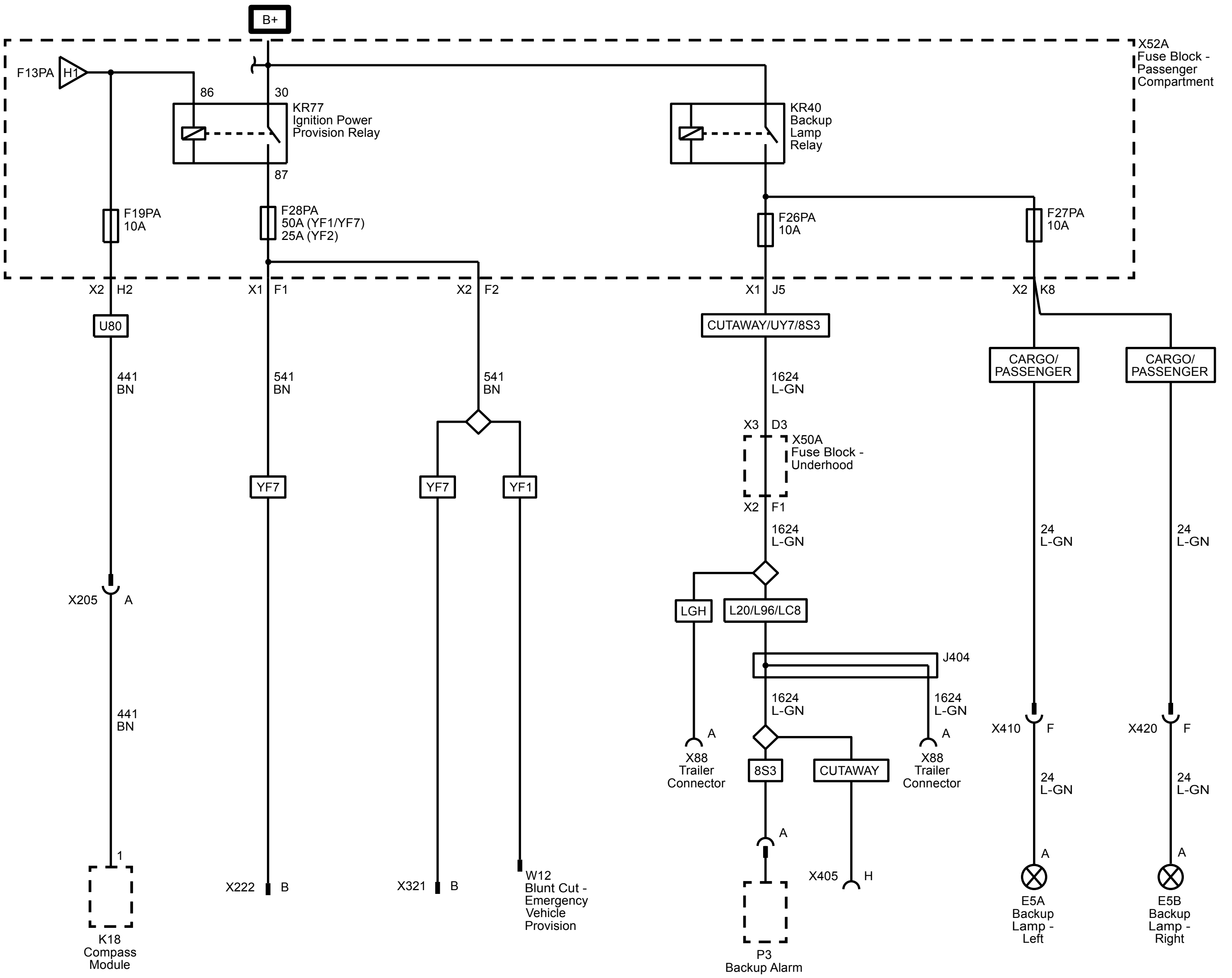
Fuses F16PA, F31PA, F32PA, and F2RA


B+
X52A
Fuse Block - Passenger Compartment
KR97
Door Lock Relay
F31PA
15A
F32PA
15A
F16PA
50A
X2
J5
G5
G4
E2
X1
E1
E24/YA2
PASSENGER/CARGO
YF7
PRP
1042
RD/BK
1042
RD/BK
1042
RD/BK
295
GY
295
GY
295
GY
295
GY
YF1
YF7
X289
A
1042
RD
B
X87RB
Sliding Door Jamb Contact Plate - Right Body
X500
B8
X600
B2
X400
F
X53A
Fuse Block - Rear Body
18
19
F2RA
15A
295
GY
295
GY
295
GY
295
GY
X321
A
X222
A
740
OG
W12
Blunt Cut - Emergency Vehicle Provision
J377
X2
B
X2
B
B (YA2)
A (E24)
X2
B
740
OG
740
OG
740
OG
A23D
Door Latch Assembly - Driver
A23P
Door Latch Assembly - Passenger
M14RR
Door Lock Actuator - Right Rear
M13
Door Latch Assembly - Rear Cargo
X53A
Fuse Block - Rear Body
1
KR89LF
Left Front Access Panel Relay
6
KR89LR
Left Rear Access Panel Relay
11
KR89RR
Right Rear Access Panel Relay

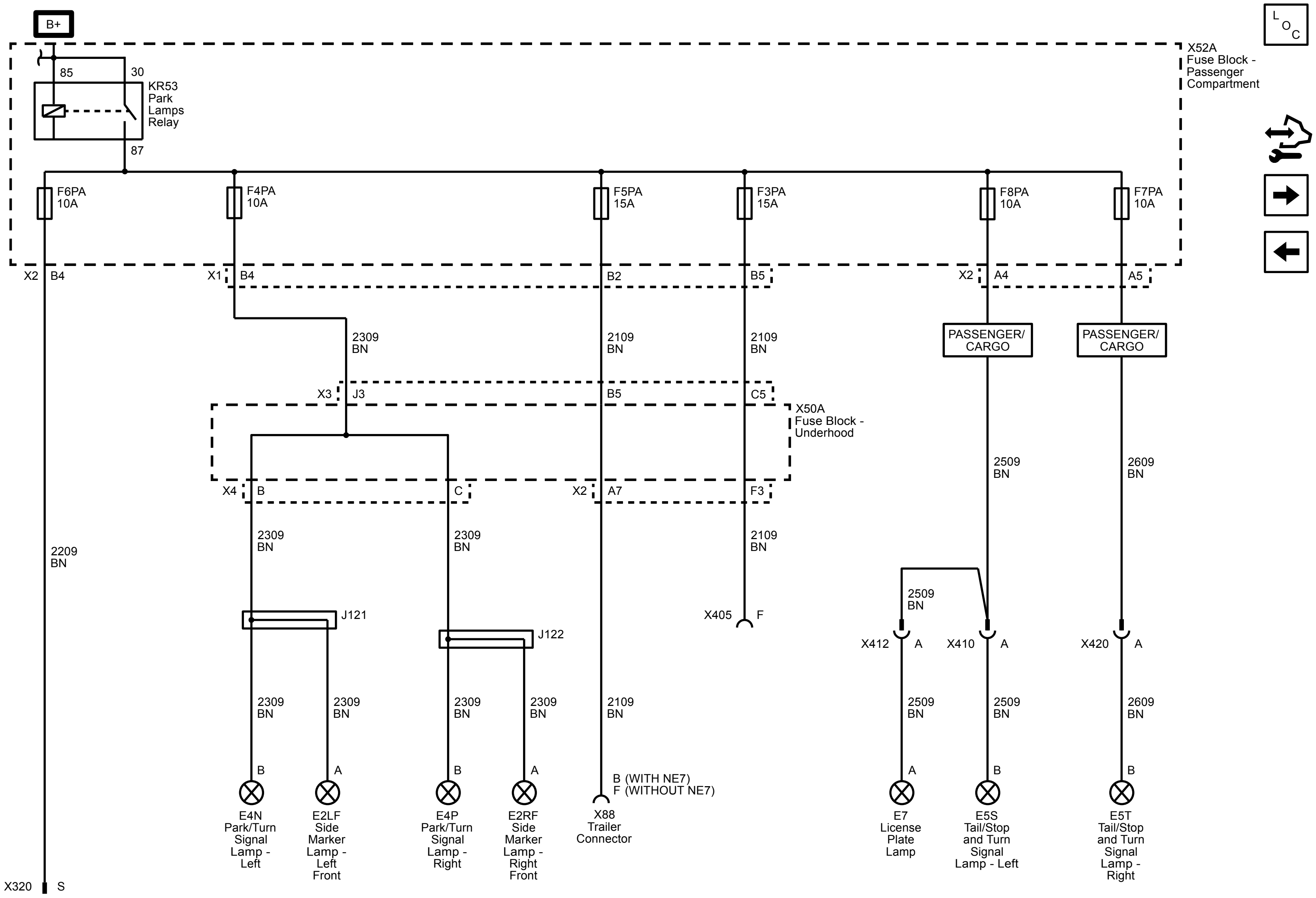
Fuses F13PA and F14PA


B+
X52A
Fuse Block - Passenger Compartment
30
KR74
Ignition Run
Relay
87
H1
F19PA
F14PA
20A
F13PA
10A
X1
D5
C8
B3
C5
X2
C4
C3
C5
KI4
LGH
C49/DE5/C60
C69/C36/ENC
C69
C49/DE5/C60
6807
D-BU
141
BN
141
BN
341
BN
341
BN
341
BN
341
BN
X205
F
341
BN
X100
5
X3
B
X407
E
141
BN
S34
HVAC
Controls
Switch
Assembly
REAR_HVAC_CONTROLS
-REAR_HVAC_CONTROLS
X1
1
X2
E
B
341
BN
J405
J307
X81
Accessory
Power
Receptacle -
110V AC
S34
HVAC
Controls
Switch
Assembly
G34
Evaporative
Emission
System Leak
Detection
Pump
J263
341
BN
341
BN
341
BN
341
BN
341
BN
341
BN
341
BN
4892
RD/WH
341
BN
341
BN
341
BN
X202
M
X420
G
341
BN
G
J
G
4892
RD/WH
10
A
C2
10
C2
10
C2
M6
Air
Temperature
Door
Actuator
KR81
Auxiliary
Battery
Relay 1
KR32C
Blower
Motor Low
Speed Relay
- Auxiliary
M37B
Mode Door
Actuator -
Auxiliary
KR32D
Blower
Motor
Medium
Speed
Relay -
Auxiliary
M6B
Air
Temperature
Door
Actuator -
Auxiliary
KR32B
Blower
Motor High
Speed
Relay -
Auxiliary
S34F
HVAC
Controls
Switch
Assembly -
Auxiliary Front
S34R
HVAC Controls
Switch
Assembly -
Auxiliary Rear
S34F
HVAC
Controls
Switch
Assembly -
Auxiliary Front

Fuses F19PA, F26PA, F27PA, and F28PA


B+
X52A
Fuse Block -
Passenger
Compartment
F13PA
H1
86
30
KR77
Ignition Power
Provision Relay
87
KR40
Backup
Lamp
Relay
F19PA
10A
F28PA
50A (YF1/YF7)
25A (YF2)
F26PA
10A
F27PA
10A
X2
H2
X1
F1
X2
F2
X1
J5
X2
K8
U80
CUTAWAY/UY7/8S3
CARGO/
PASSENGER
CARGO/
PASSENGER
441
BN
541
BN
541
BN
1624
L-GN
X3
D3
X50A
Fuse Block -
Underhood
X2
F1
YF7
YF7
YF1
1624
L-GN
24
L-GN
24
L-GN
X205
A
441
BN
LGH
L20/L96/LC8
J404
1624
L-GN
1624
L-GN
A
X88
Trailer
Connector
8S3
CUTAWAY
A
X88
Trailer
Connector
X410
F
X420
F
24
L-GN
24
L-GN
1
A
X405
H
A
A
X222
B
X321
B
W12
Blunt Cut -
Emergency
Vehicle
Provision
K18
Compass
Module
P3
Backup Alarm
E5A
Backup
Lamp -
Left
E5B
Backup
Lamp -
Right

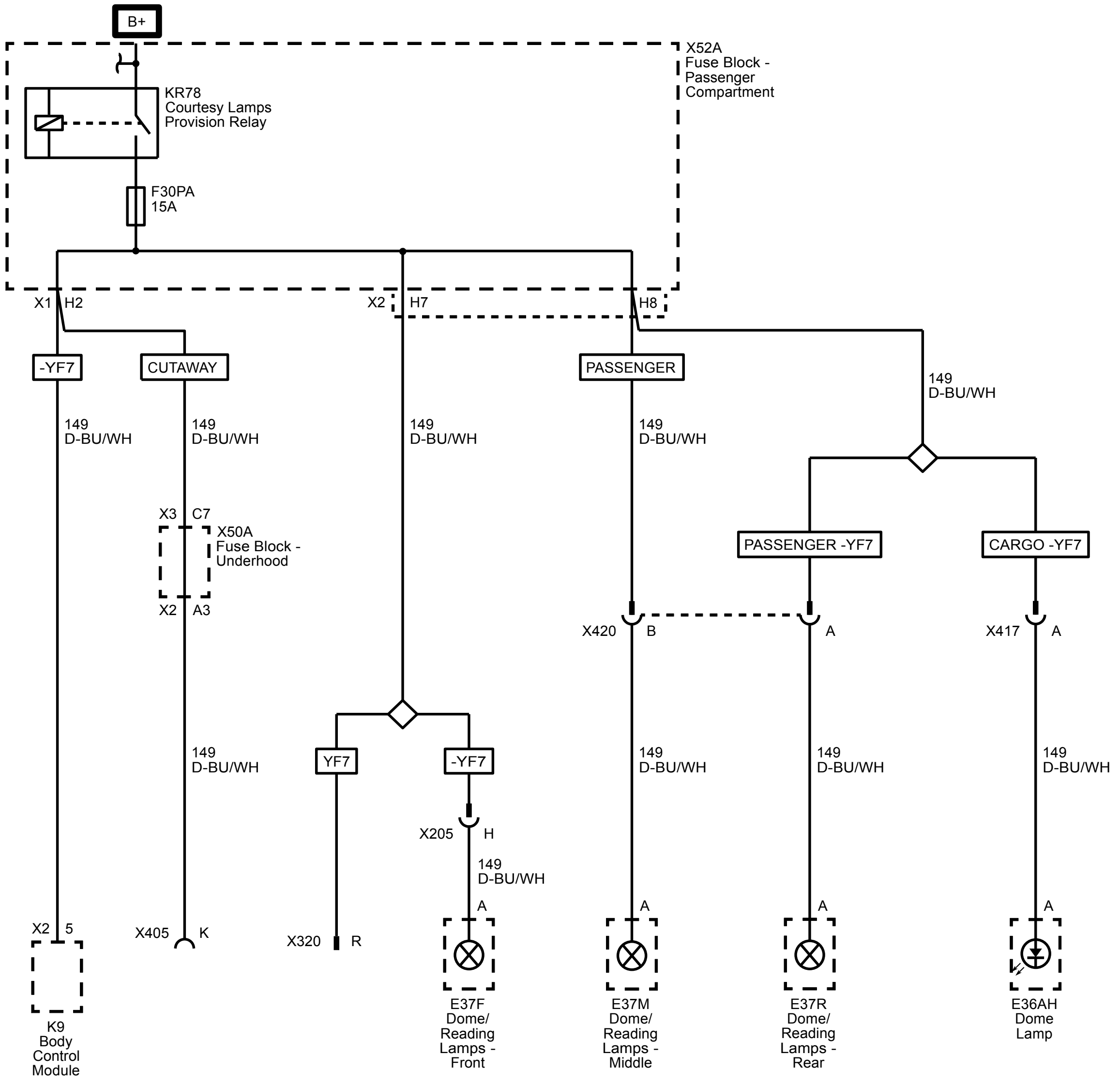
Fuses F3PA, F4PA, F5PA, F6PA, F7PA, and F8PA



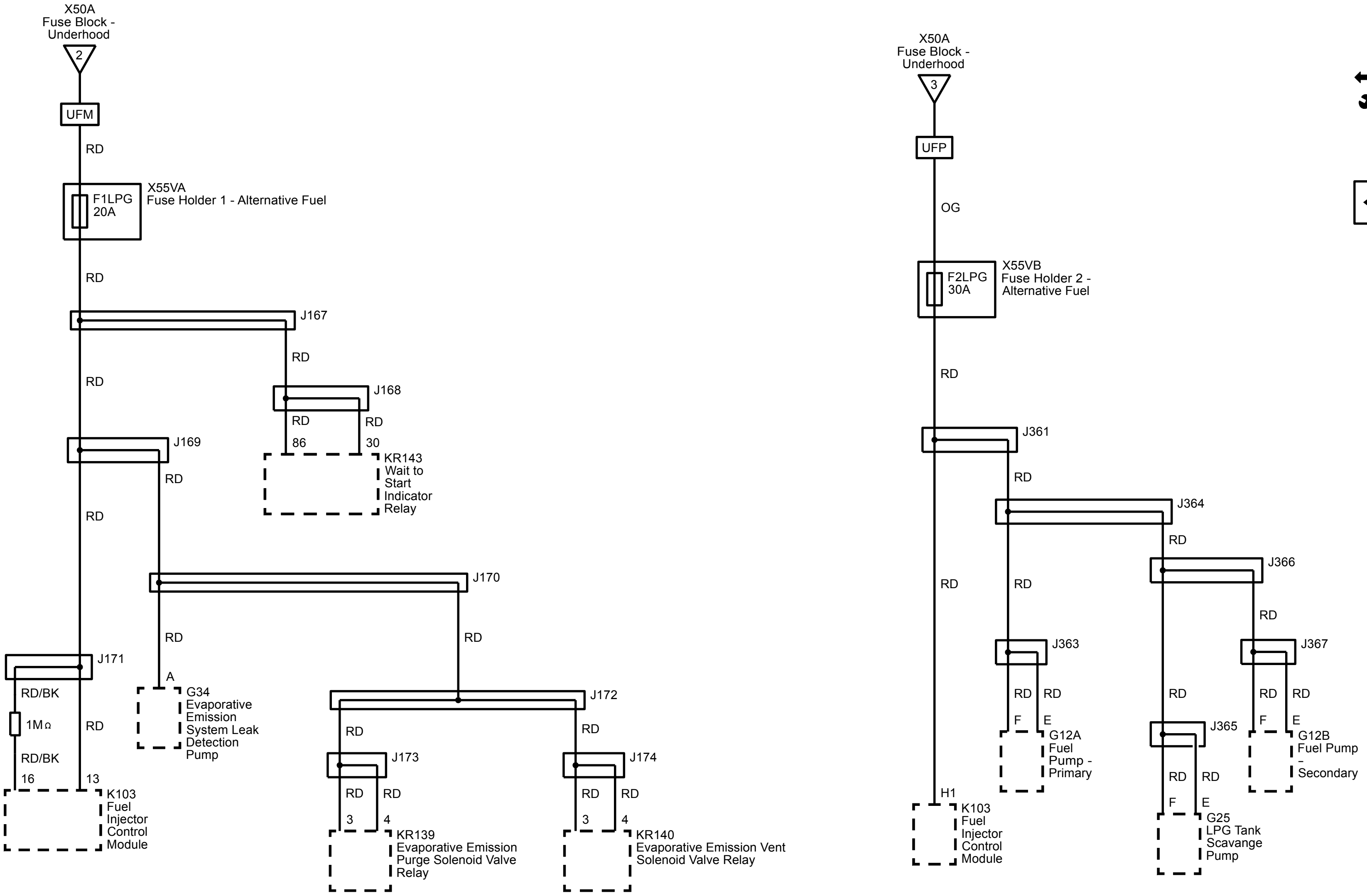
B+
L O C
X52A Fuse Block - Passenger Compartment
85
30
KR53 Park Lamps Relay
87
F6PA 10A
F4PA 10A
F5PA 15A
F3PA 15A
F8PA 10A
F7PA 10A
X2 B4
X1 B4
B2
B5
X2 A4
A5
2309 BN
2109 BN
2109 BN
PASSENGER/ CARGO
PASSENGER/ CARGO
X3 J3
B5
C5
X50A Fuse Block - Underhood
2509 BN
2609 BN
X4 B
C
X2 A7
F3
2209 BN
2309 BN
2309 BN
2109 BN
J121
J122
X405 F
2509 BN
X412 A
X410 A
X420 A
2309 BN
2309 BN
2309 BN
2309 BN
2109 BN
2509 BN
2509 BN
2609 BN
B
A
B
A
B (WITH NE7)
F (WITHOUT NE7)
A
B
B
E4N Park/Turn Signal Lamp - Left
E2LF Side Marker Lamp - Left Front
E4P Park/Turn Signal Lamp - Right
E2RF Side Marker Lamp - Right Front
X88 Trailer Connector
E7 License Plate Lamp
E5S Tail/Stop and Turn Signal Lamp - Left
E5T Tail/Stop and Turn Signal Lamp - Right
X320 S

Fuse F30PA

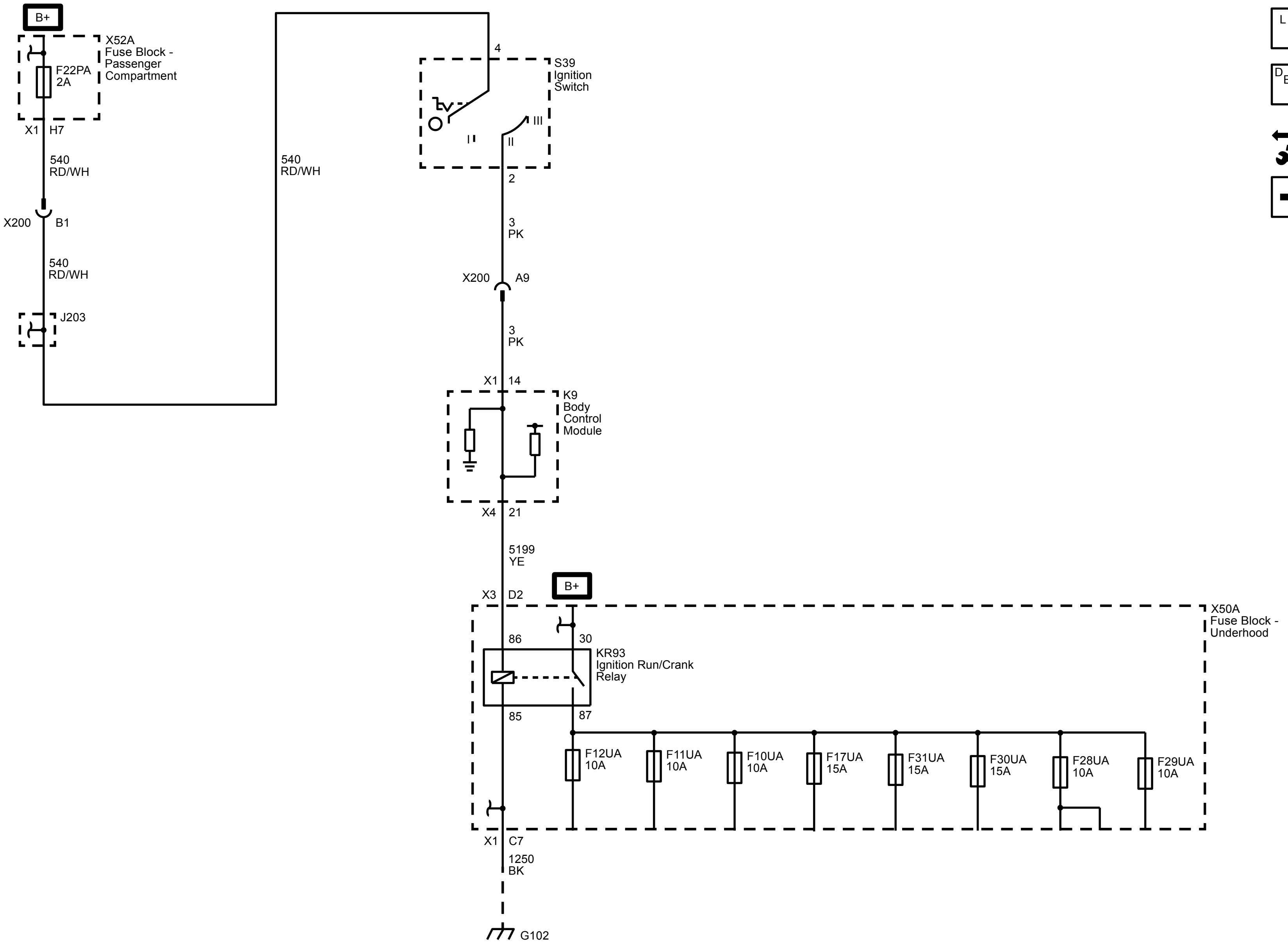
LOC
DESC


B+
X52A
Fuse Block -
Passenger
Compartment
KR78
Courtesy Lamps
Provision Relay
F30PA
15A
X1
H2
X2
H7
H8
-YF7
CUTAWAY
PASSENGER
149
D-BU/WH
149
D-BU/WH
149
D-BU/WH
149
D-BU/WH
149
D-BU/WH
X3
C7
X50A
Fuse Block -
Underhood
X2
A3
PASSENGER -YF7
CARGO -YF7
X420
B
A
X417
A
149
D-BU/WH
YF7
-YF7
149
D-BU/WH
149
D-BU/WH
149
D-BU/WH
X205
H
149
D-BU/WH
X2
5
X405
K
X320
R
A
A
A
A
K9
Body
Control
Module
E37F
Dome/
Reading
Lamps -
Front
E37M
Dome/
Reading
Lamps -
Middle
E37R
Dome/
Reading
Lamps -
Rear
E36AH
Dome
Lamp

F1LPG and F2LPG (KO7)

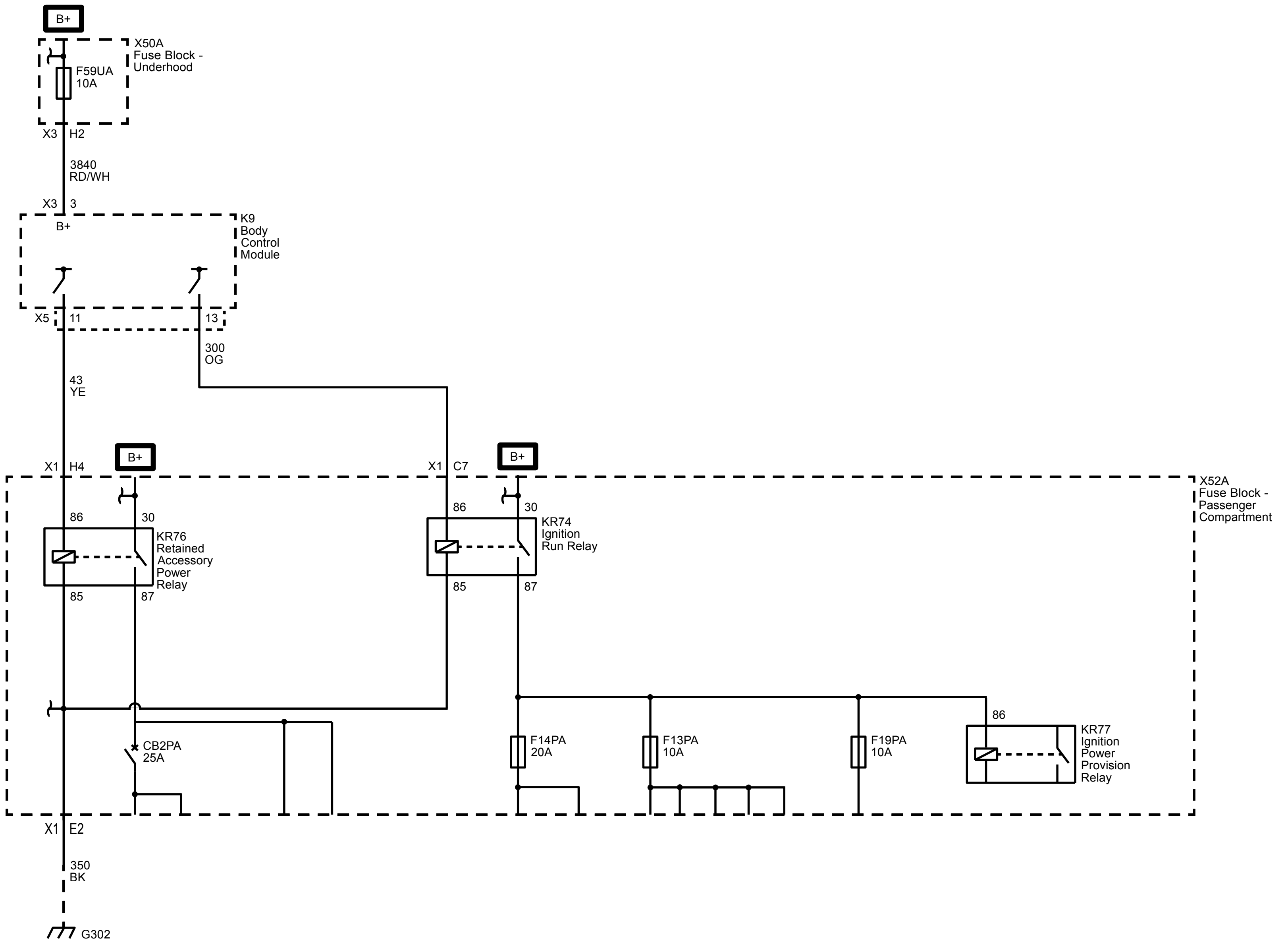

X50A
Fuse Block -
Underhood
2
UFM
RD
F1LPG
20A
X55VA
Fuse Holder 1 - Alternative Fuel
RD
J167
RD
RD
J168
RD
RD
86
30
KR143
Wait to
Start
Indicator
Relay
J169
RD
RD
J170
RD
RD
J171
RD/BK
1MΩ
RD/BK
RD
16
13
K103
Fuel
Injector
Control
Module
A
G34
Evaporative
Emission
System Leak
Detection
Pump
J172
RD
RD
J173
RD
RD
3
4
KR139
Evaporative Emission
Purge Solenoid Valve
Relay
J174
RD
RD
3
4
KR140
Evaporative Emission Vent
Solenoid Valve Relay
X50A
Fuse Block -
Underhood
3
UFP
OG
F2LPG
30A
X55VB
Fuse Holder 2 -
Alternative Fuel
RD
J361
RD
J364
RD
J366
RD
RD
RD
J363
RD
RD
F
E
G12A
Fuel
Pump -
Primary
J367
RD
RD
F
E
G12B
Fuel Pump
-
Secondary
RD
J365
RD
RD
F
E
G25
LPG Tank
Scavange
Pump
H1
K103
Fuel
Injector
Control
Module

Ignition Run/Crank Relay

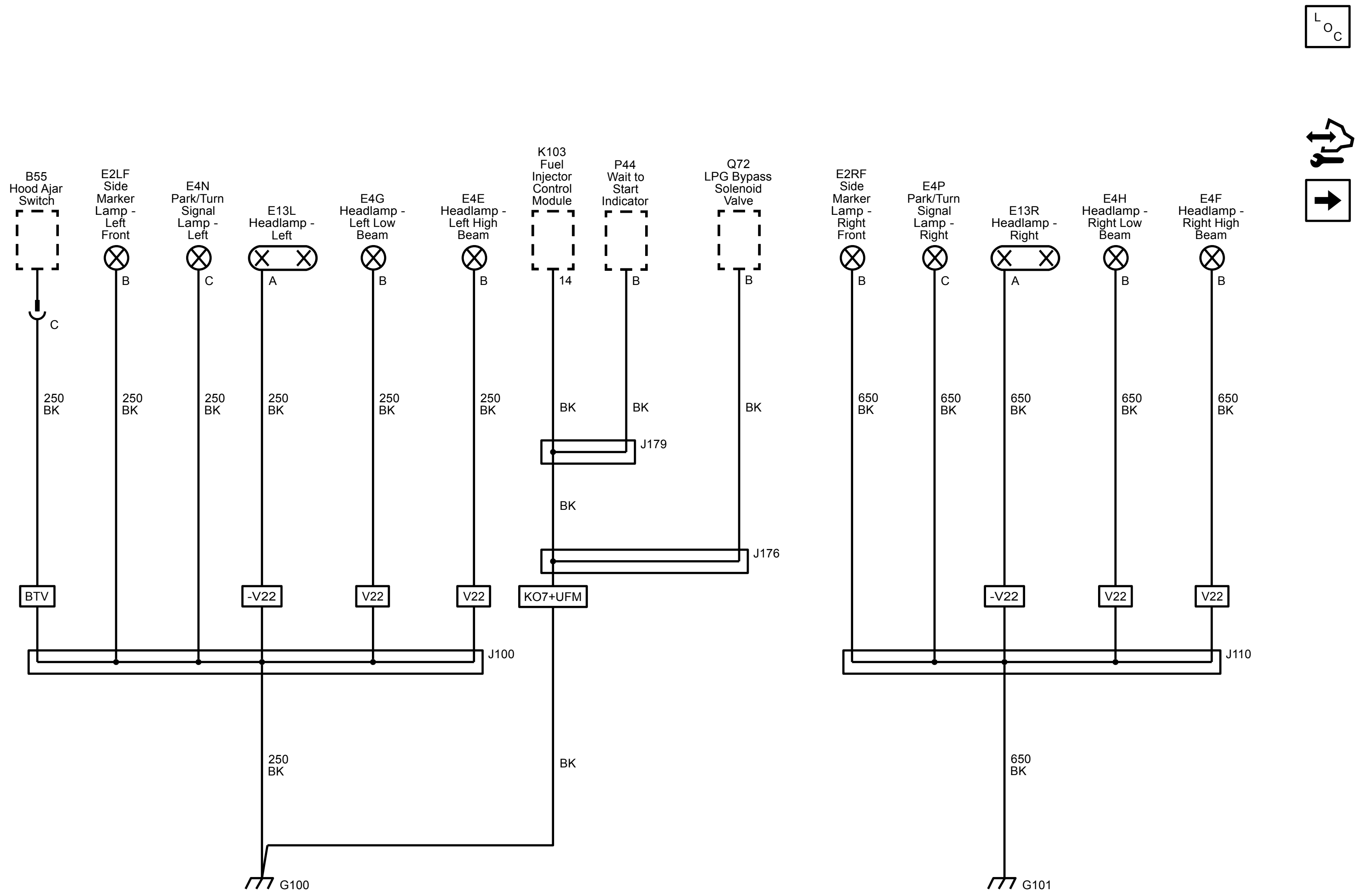

B+
X52A
Fuse Block -
Passenger
Compartment
F22PA
2A
X1 H7
540
RD/WH
X200 B1
540
RD/WH
J203
540
RD/WH
4
S39
Ignition
Switch
I
II
III
2
3
PK
X200 A9
3
PK
X1 14
K9
Body
Control
Module
X4 21
5199
YE
X3 D2
B+
X50A
Fuse Block -
Underhood
86
30
KR93
Ignition Run/Crank
Relay
85
87
F12UA
10A
F11UA
10A
F10UA
10A
F17UA
15A
F31UA
15A
F30UA
15A
F28UA
10A
F29UA
10A
X1 C7
1250
BK
G102

Retained Accessory Power Relay and Ignition Run Relay

LOC
DESC

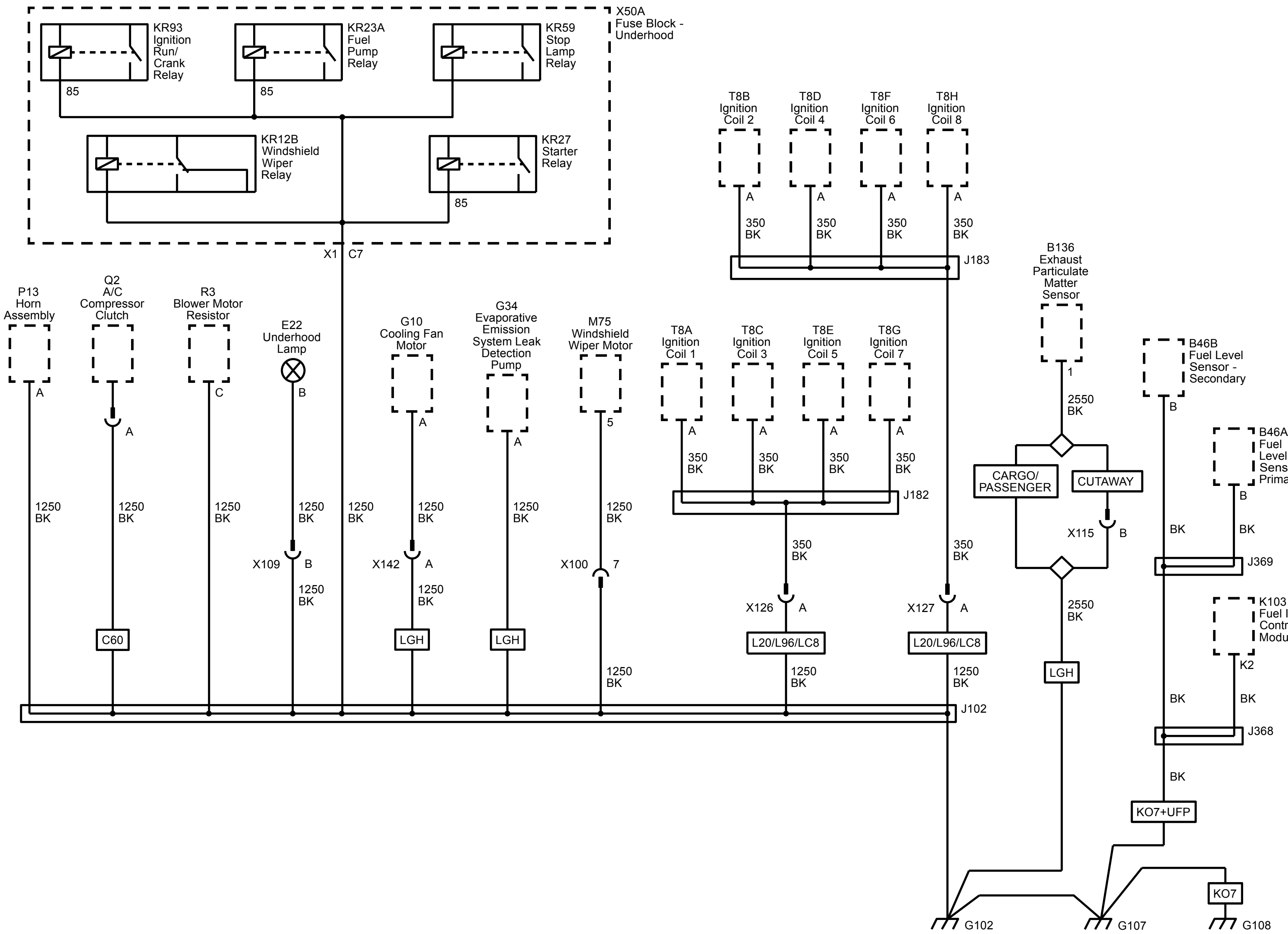

B+
X50A
Fuse Block -
Underhood
F59UA
10A
X3
H2
3840
RD/WH
X3
3
B+
K9
Body
Control
Module
X5
11
13
300
OG
43
YE
X1
H4
B+
X1
C7
B+
86
30
KR76
Retained
Accessory
Power
Relay
85
87
86
30
KR74
Ignition
Run Relay
85
87
X52A
Fuse Block -
Passenger
Compartment
CB2PA
25A
F14PA
20A
F13PA
10A
F19PA
10A
86
KR77
Ignition
Power
Provision
Relay
X1
E2
350
BK
G302

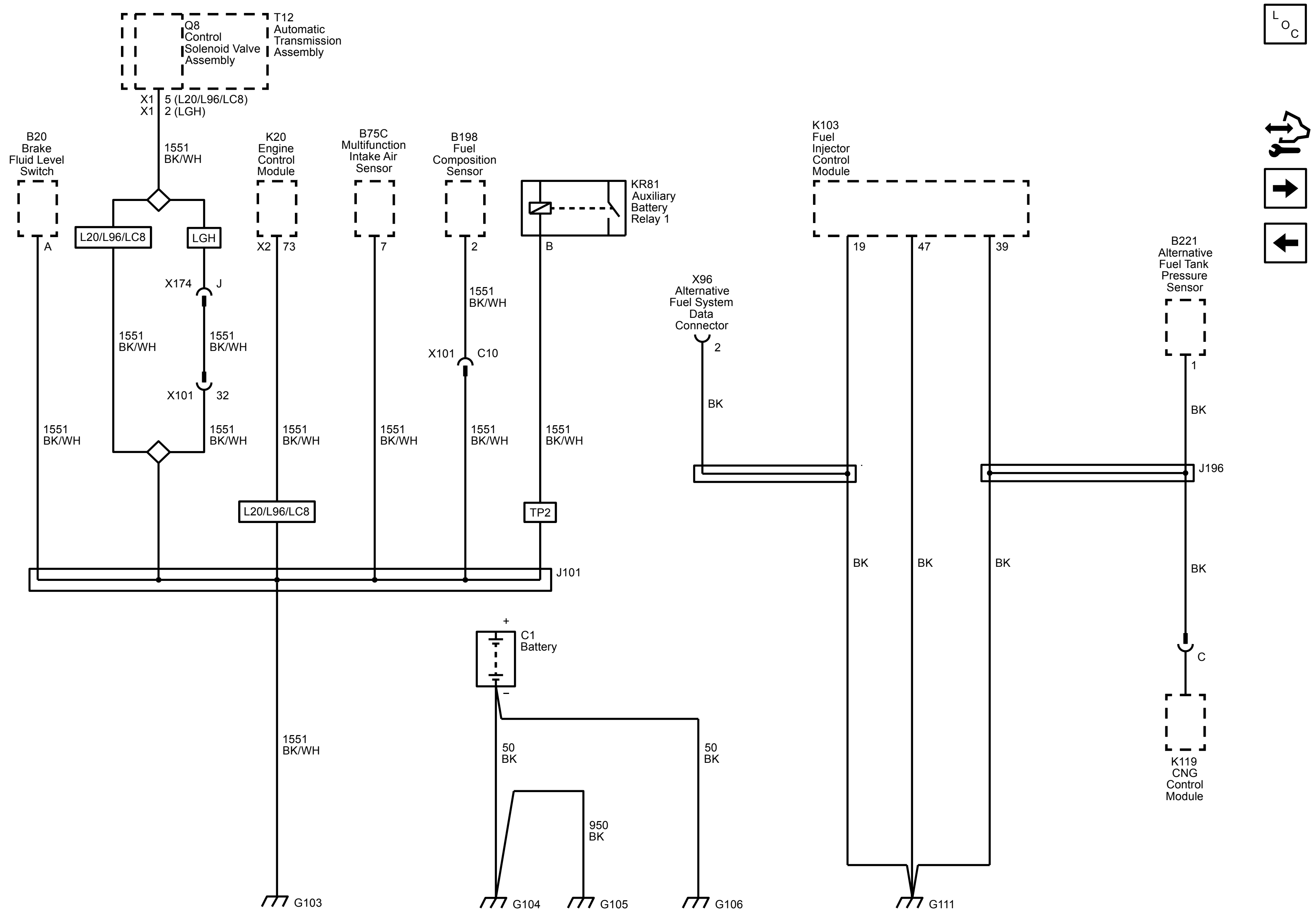
G100 and G101



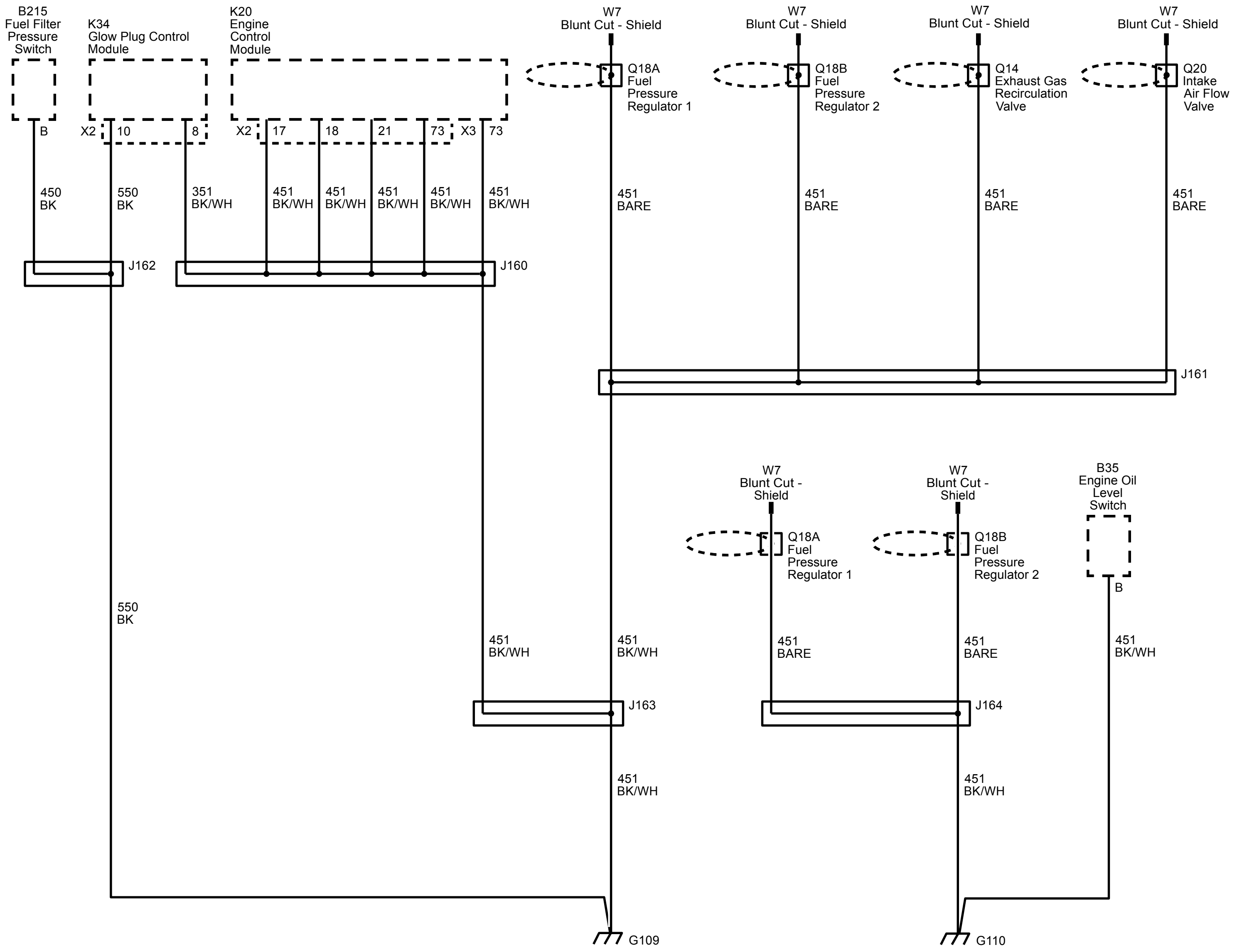
L O C
B55 Hood Ajar Switch
E2LF Side Marker Lamp - Left Front
E4N Park/Turn Signal Lamp - Left
E13L Headlamp - Left
E4G Headlamp - Left Low Beam
E4E Headlamp - Left High Beam
K103 Fuel Injector Control Module
P44 Wait to Start Indicator
Q72 LPG Bypass Solenoid Valve
E2RF Side Marker Lamp - Right Front
E4P Park/Turn Signal Lamp - Right
E13R Headlamp - Right
E4H Headlamp - Right Low Beam
E4F Headlamp - Right High Beam
C
B
C
A
B
B
14
B
B
B
C
A
B
B
250 BK
650 BK
BK
J179
J176
BTV
-V22
V22
KO7+UFM
J100
J110
G100
G101

G102, G107 and G108

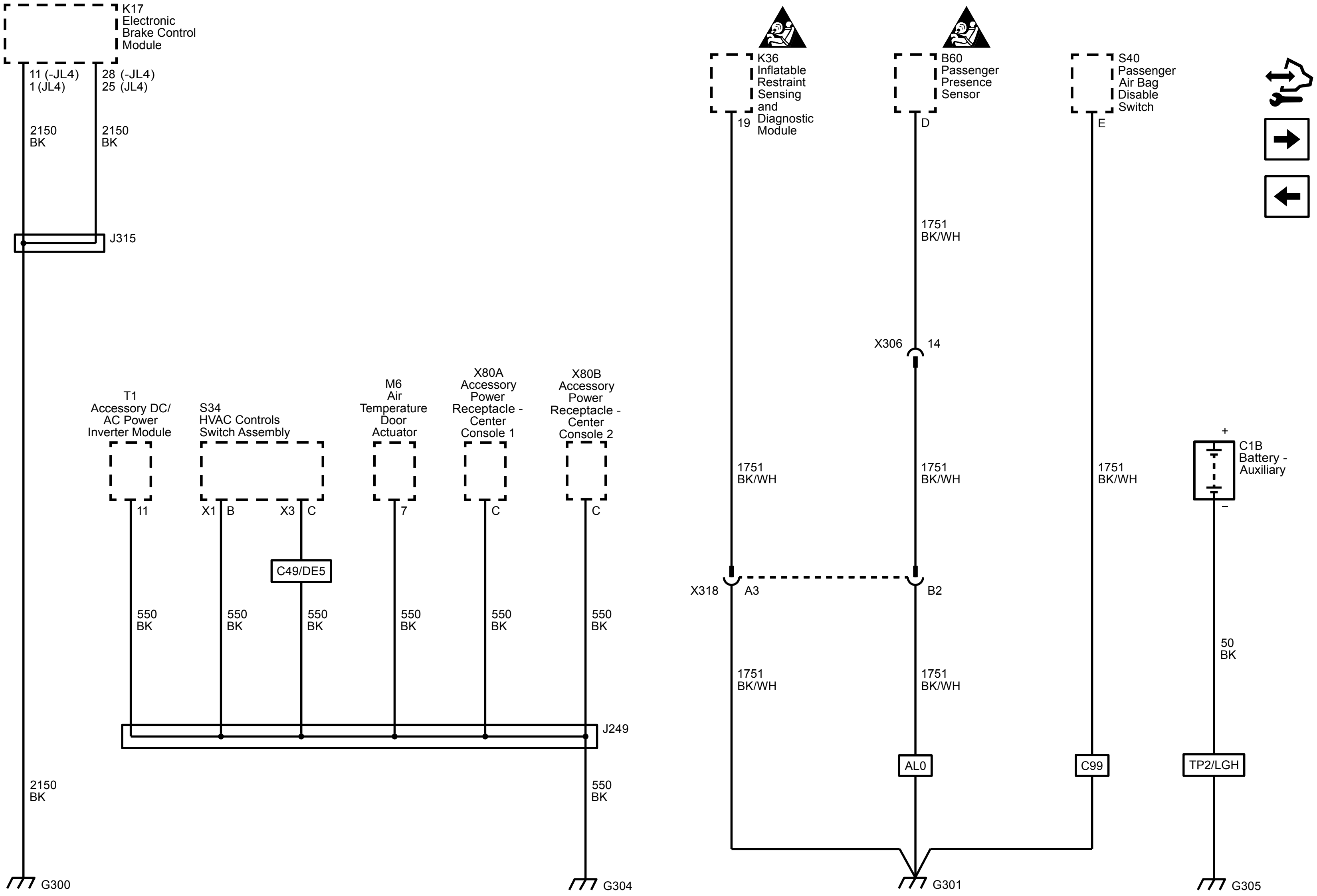

X50A
Fuse Block -
Underhood
KR93
Ignition
Run/
Crank
Relay
85
KR23A
Fuel
Pump
Relay
85
KR59
Stop
Lamp
Relay
KR12B
Windshield
Wiper
Relay
KR27
Starter
Relay
85
X1 C7
T8B
Ignition
Coil 2
T8D
Ignition
Coil 4
T8F
Ignition
Coil 6
T8H
Ignition
Coil 8
A
350
BK
J183
P13
Horn
Assembly
Q2
A/C
Compressor
Clutch
R3
Blower Motor
Resistor
E22
Underhood
Lamp
G10
Cooling Fan
Motor
G34
Evaporative
Emission
System Leak
Detection
Pump
M75
Windshield
Wiper Motor
T8A
Ignition
Coil 1
T8C
Ignition
Coil 3
T8E
Ignition
Coil 5
T8G
Ignition
Coil 7
B136
Exhaust
Particulate
Matter
Sensor
1
2550
BK
B46B
Fuel Level
Sensor -
Secondary
B46A
Fuel
Level
Sensor -
Primary
A
C
B
5
1250
BK
J182
CARGO/
PASSENGER
CUTAWAY
X115
B
J369
X109
X142
X100
7
X126
X127
C60
LGH
L20/L96/LC8
K103
Fuel Injector
Control
Module
K2
J102
J368
KO7+UFP
KO7
G102
G107
G108


Q8
Control
Solenoid Valve
Assembly
T12
Automatic
Transmission
Assembly
X1 5 (L20/L96/LC8)
X1 2 (LGH)
1551
BK/WH
B20
Brake
Fluid Level
Switch
A
L20/L96/LC8
LGH
X174 J
X101 32
K20
Engine
Control
Module
X2 73
B75C
Multifunction
Intake Air
Sensor
7
B198
Fuel
Composition
Sensor
2
X101 C10
KR81
Auxiliary
Battery
Relay 1
B
TP2
J101
K103
Fuel
Injector
Control
Module
19
47
39
X96
Alternative
Fuel System
Data
Connector
2
BK
B221
Alternative
Fuel Tank
Pressure
Sensor
1
J196
C
K119
CNG
Control
Module
C1
Battery
+
−
50
BK
950
BK
G103
G104
G105
G106
G111
L
O
C

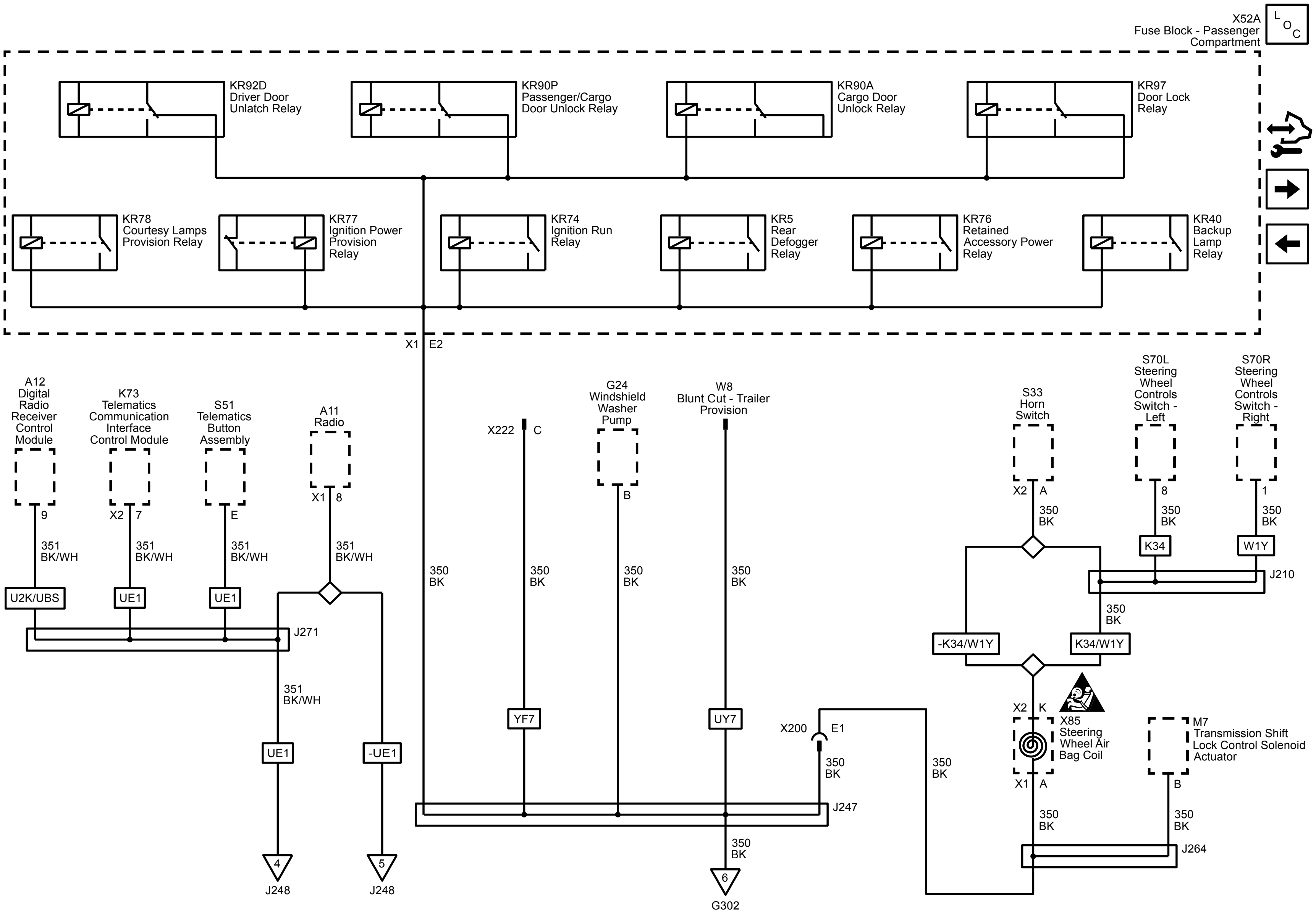
G109 (LWN) and G110 (LWN)


B215
Fuel Filter
Pressure
Switch
K34
Glow Plug Control
Module
K20
Engine
Control
Module
W7
Blunt Cut - Shield
Q18A
Fuel
Pressure
Regulator 1
Q18B
Fuel
Pressure
Regulator 2
Q14
Exhaust Gas
Recirculation
Valve
Q20
Intake
Air Flow
Valve
B
X2
10
8
X2
17
18
21
73
X3
73
450
BK
550
BK
351
BK/WH
451
BK/WH
451
BARE
J162
J160
J161
B35
Engine Oil
Level
Switch
J163
J164
G109
G110

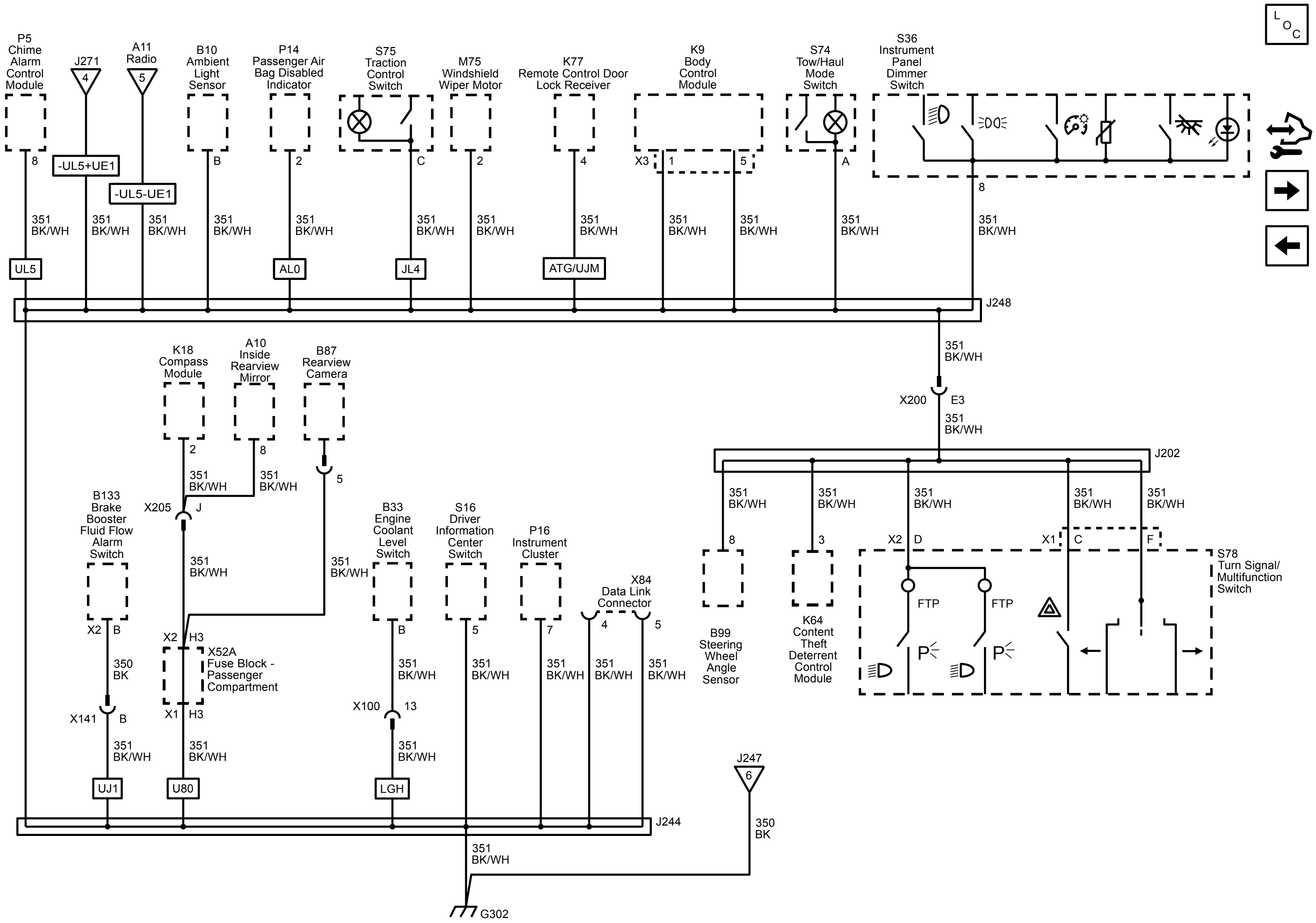
G300, G301, G304, and G305



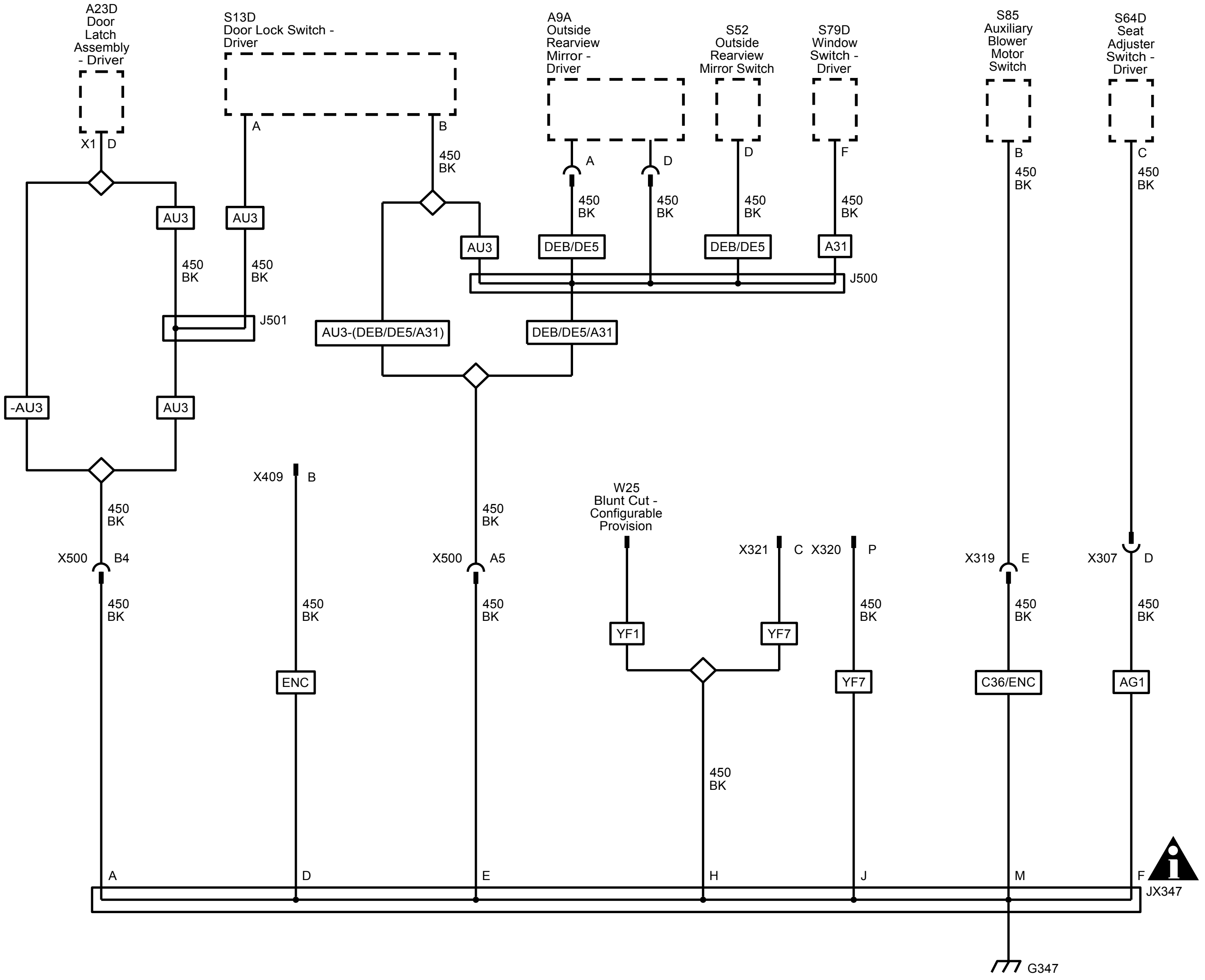
K17
Electronic
Brake Control
Module
11 (-JL4)
1 (JL4)
28 (-JL4)
25 (JL4)
2150
BK
2150
BK
J315
2150
BK
G300
T1
Accessory DC/
AC Power
Inverter Module
11
S34
HVAC Controls
Switch Assembly
X1 B
X3 C
C49/DE5
M6
Air
Temperature
Door
Actuator
7
X80A
Accessory
Power
Receptacle -
Center
Console 1
C
X80B
Accessory
Power
Receptacle -
Center
Console 2
C
550
BK
550
BK
550
BK
550
BK
550
BK
550
BK
J249
550
BK
G304
K36
Inflatable
Restraint
Sensing
and
Diagnostic
Module
19
B60
Passenger
Presence
Sensor
D
S40
Passenger
Air Bag
Disable
Switch
E
1751
BK/WH
X306
14
1751
BK/WH
1751
BK/WH
1751
BK/WH
X318
A3
B2
1751
BK/WH
1751
BK/WH
AL0
C99
G301
+
C1B
Battery -
Auxiliary
-
50
BK
TP2/LGH
G305

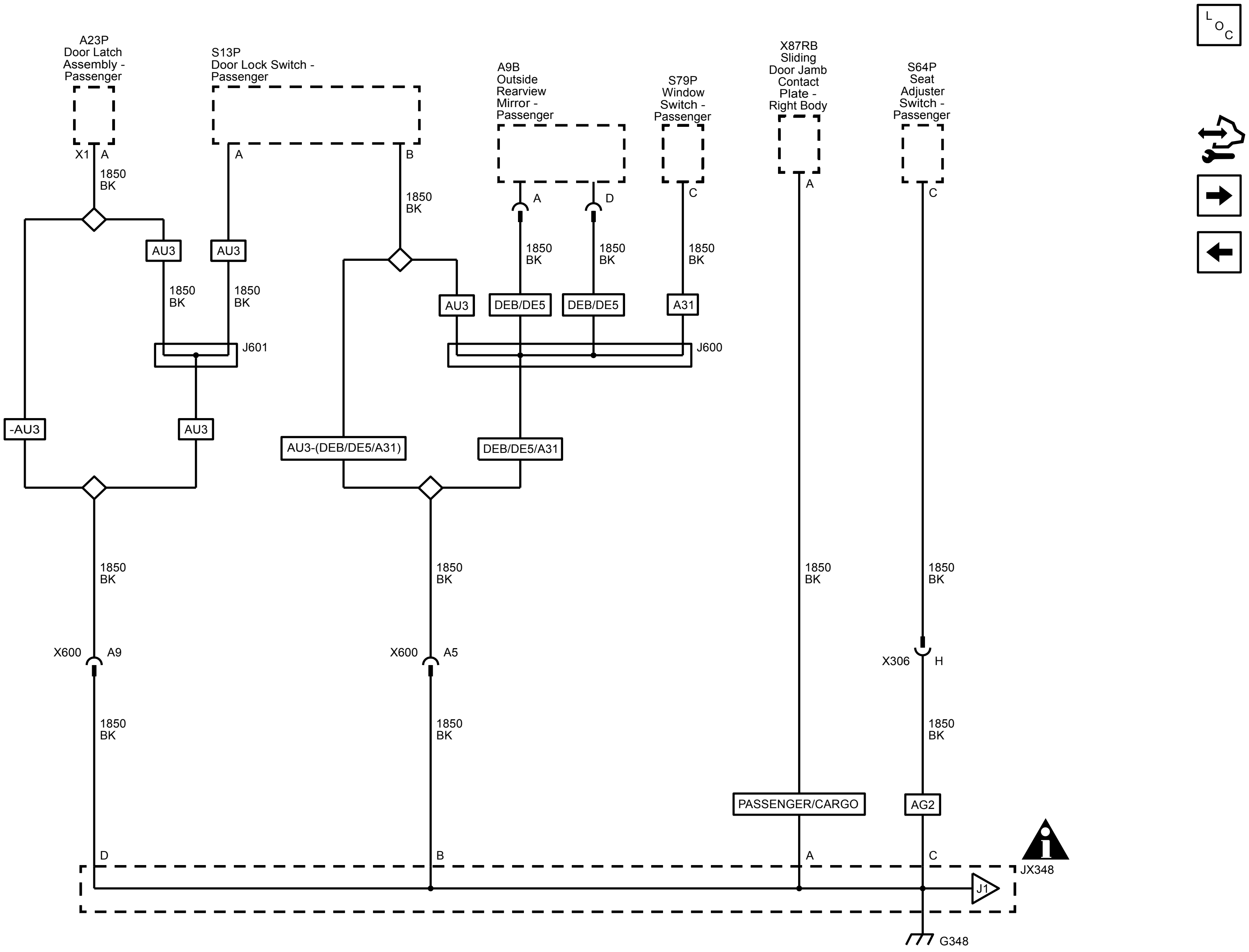

X52A
Fuse Block - Passenger Compartment
LOC
KR92D Driver Door Unlatch Relay
KR90P Passenger/Cargo Door Unlock Relay
KR90A Cargo Door Unlock Relay
KR97 Door Lock Relay
KR78 Courtesy Lamps Provision Relay
KR77 Ignition Power Provision Relay
KR74 Ignition Run Relay
KR5 Rear Defogger Relay
KR76 Retained Accessory Power Relay
KR40 Backup Lamp Relay
X1 E2
A12 Digital Radio Receiver Control Module
K73 Telematics Communication Interface Control Module
S51 Telematics Button Assembly
A11 Radio
9
X2 7
E
X1 8
351 BK/WH
U2K/UBS
UE1
J271
-UE1
4 J248
5 J248
350 BK
X222 C
G24 Windshield Washer Pump
B
W8 Blunt Cut - Trailer Provision
YF7
UY7
X200 E1
J247
6 G302
S33 Horn Switch
X2 A
S70L Steering Wheel Controls Switch - Left
8
S70R Steering Wheel Controls Switch - Right
1
K34
W1Y
J210
-K34/W1Y
K34/W1Y
X2 K
X85 Steering Wheel Air Bag Coil
X1 A
M7 Transmission Shift Lock Control Solenoid Actuator
J264

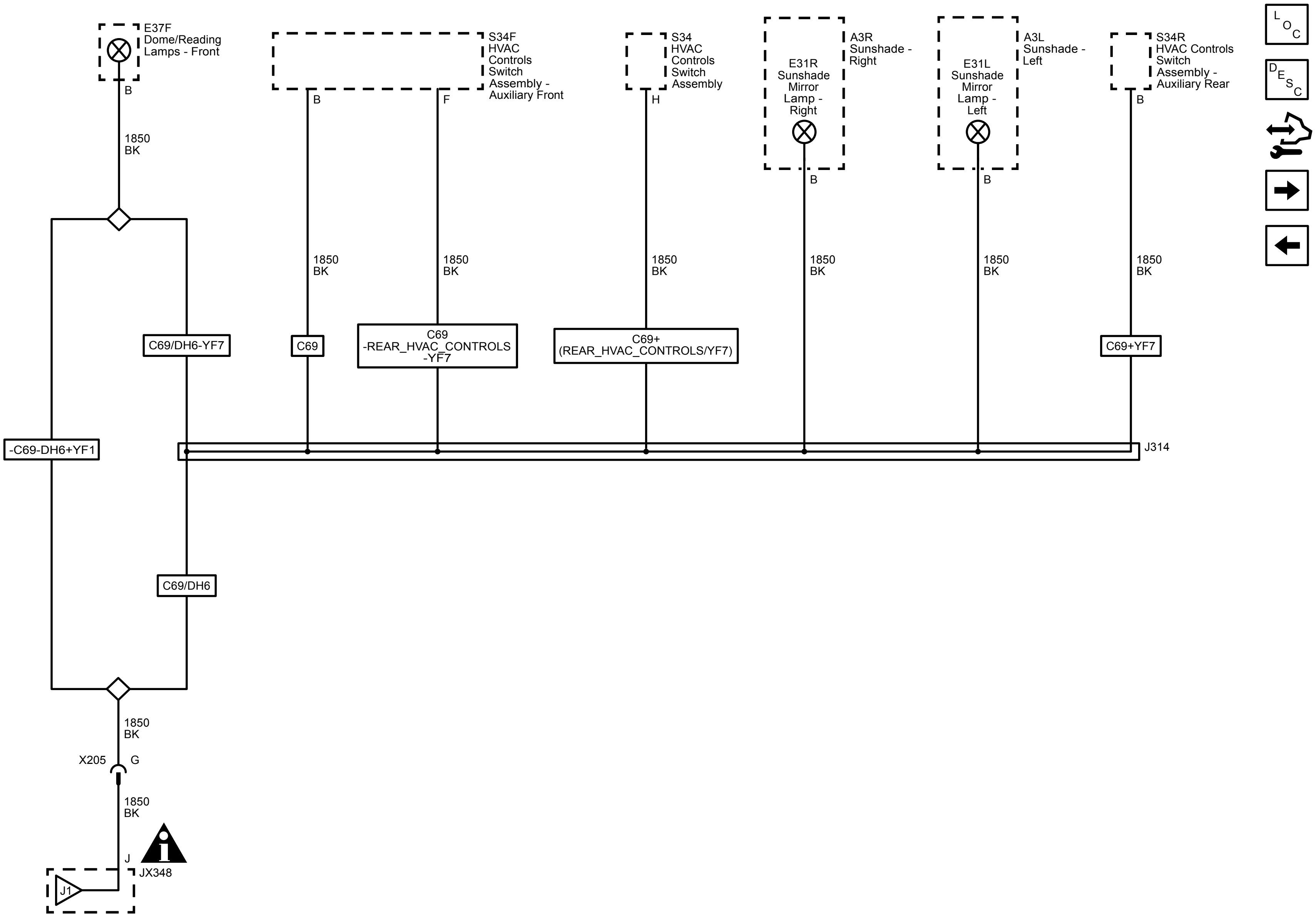
G302 (2 of 2)


L O C
P5 Chime Alarm Control Module
J271
4
A11 Radio
5
B10 Ambient Light Sensor
P14 Passenger Air Bag Disabled Indicator
S75 Traction Control Switch
M75 Windshield Wiper Motor
K77 Remote Control Door Lock Receiver
K9 Body Control Module
S74 Tow/Haul Mode Switch
S36 Instrument Panel Dimmer Switch
8
-UL5+UE1
-UL5-UE1
B
2
C
2
4
X3
1
5
A
8
351 BK/WH
UL5
AL0
JL4
ATG/UJM
J248
351 BK/WH
X200
E3
351 BK/WH
J202
K18 Compass Module
A10 Inside Rearview Mirror
B87 Rearview Camera
2
8
5
351 BK/WH
X205
J
B133 Brake Booster Fluid Flow Alarm Switch
B33 Engine Coolant Level Switch
S16 Driver Information Center Switch
P16 Instrument Cluster
X84 Data Link Connector
4
5
X2
B
X2
H3
X52A Fuse Block - Passenger Compartment
X1
H3
350 BK
X141
B
B
5
7
X100
13
UJ1
U80
LGH
J244
J247
6
350 BK
G302
8
3
X2
D
X1
C
F
B99 Steering Wheel Angle Sensor
K64 Content Theft Deterrent Control Module
S78 Turn Signal/ Multifunction Switch
FTP
FTP

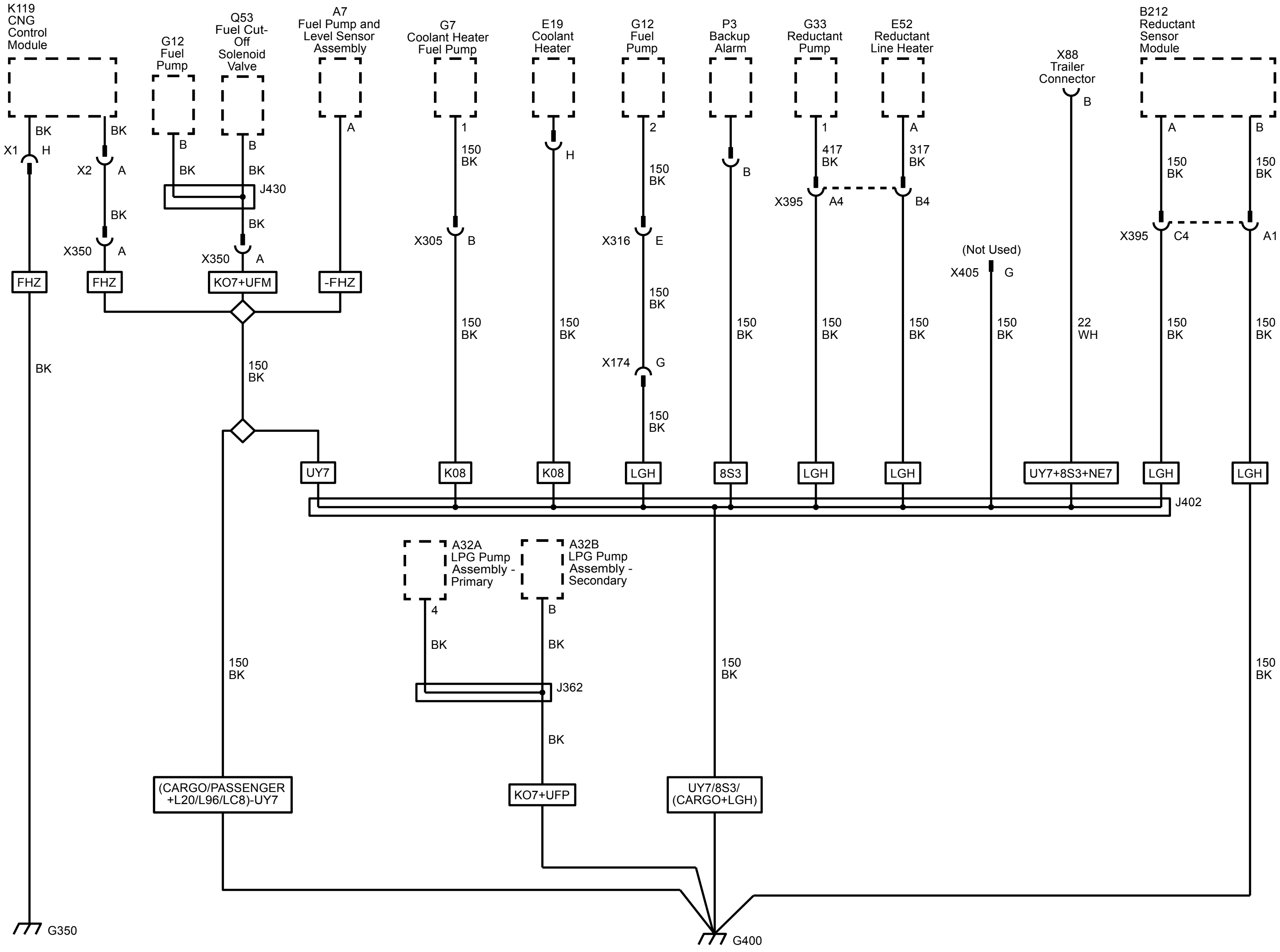
G347


A23D
Door
Latch
Assembly
- Driver
X1 D
S13D
Door Lock Switch -
Driver
A
B
450
BK
A9A
Outside
Rearview
Mirror -
Driver
A
D
S52
Outside
Rearview
Mirror Switch
D
S79D
Window
Switch -
Driver
F
S85
Auxiliary
Blower
Motor
Switch
B
450
BK
S64D
Seat
Adjuster
Switch -
Driver
C
450
BK
AU3
AU3
450
BK
450
BK
AU3
DEB/DE5
450
BK
450
BK
DEB/DE5
450
BK
A31
450
BK
J500
J501
AU3-(DEB/DE5/A31)
DEB/DE5/A31
-AU3
AU3
450
BK
X500
B4
X409
B
450
BK
X500
A5
W25
Blunt Cut -
Configurable
Provision
X321
C
X320
P
X319
E
X307
D
450
BK
450
BK
450
BK
YF1
YF7
450
BK
450
BK
450
BK
ENC
YF7
C36/ENC
AG1
450
BK
A
D
E
H
J
M
F
JX347
G347

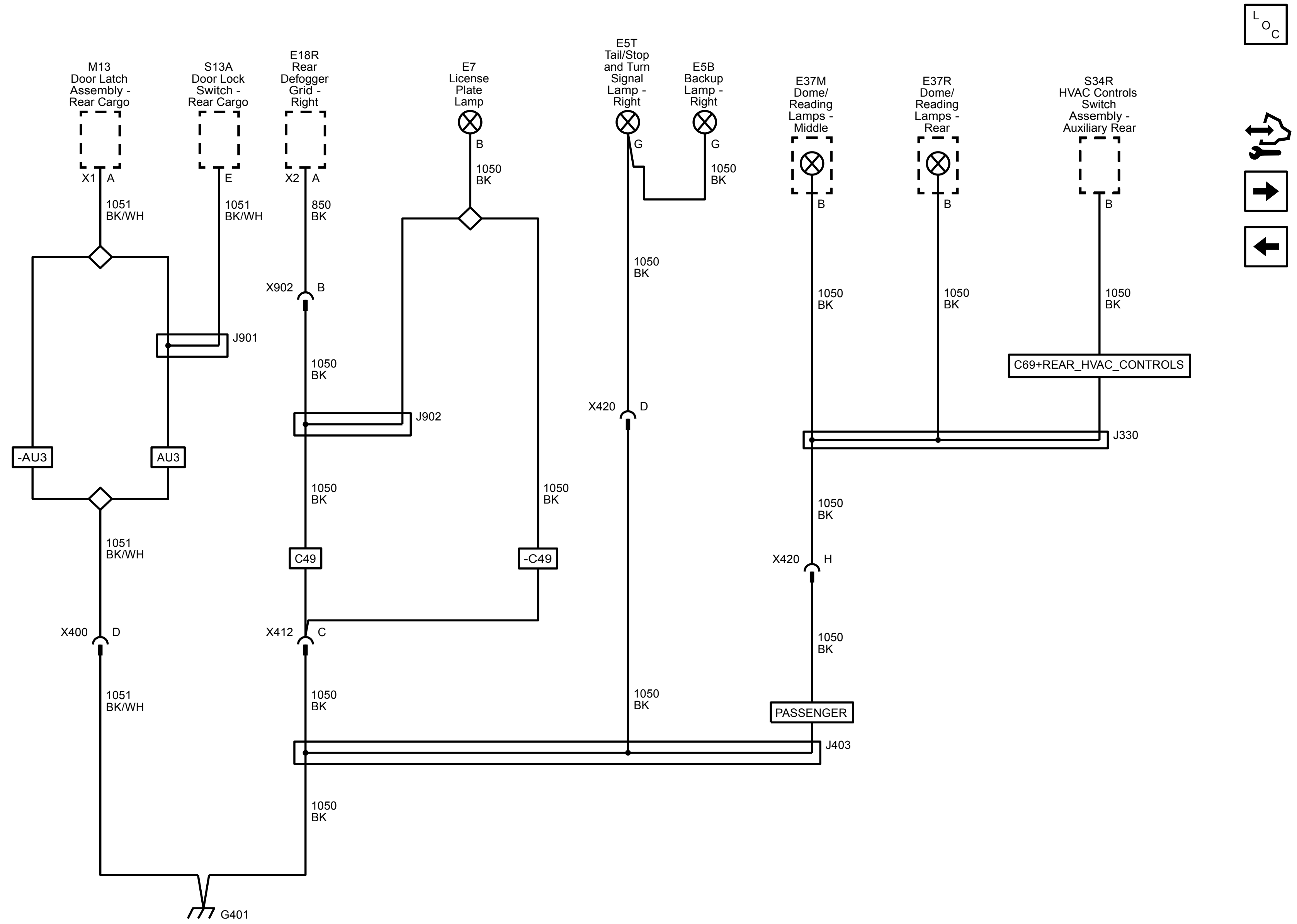

A23P
Door Latch
Assembly -
Passenger
S13P
Door Lock Switch -
Passenger
A9B
Outside
Rearview
Mirror -
Passenger
S79P
Window
Switch -
Passenger
X87RB
Sliding
Door Jamb
Contact
Plate -
Right Body
S64P
Seat
Adjuster
Switch -
Passenger
X1
A
B
C
D
H
1850
BK
AU3
-AU3
DEB/DE5
A31
J601
J600
AU3-(DEB/DE5/A31)
DEB/DE5/A31
X600
A9
A5
X306
PASSENGER/CARGO
AG2
JX348
J1
G348
LOC


E37F
Dome/Reading
Lamps - Front
B
1850
BK
S34F
HVAC
Controls
Switch
Assembly -
Auxiliary Front
B
F
S34
HVAC
Controls
Switch
Assembly
H
A3R
Sunshade -
Right
E31R
Sunshade
Mirror
Lamp -
Right
B
A3L
Sunshade -
Left
E31L
Sunshade
Mirror
Lamp -
Left
B
S34R
HVAC Controls
Switch
Assembly -
Auxiliary Rear
B
1850
BK
1850
BK
1850
BK
1850
BK
1850
BK
1850
BK
C69/DH6-YF7
C69
C69
-REAR_HVAC_CONTROLS
-YF7
C69+
(REAR_HVAC_CONTROLS/YF7)
C69+YF7
-C69-DH6+YF1
J314
C69/DH6
1850
BK
X205
G
1850
BK
J
JX348
J1
L O C
D E S C

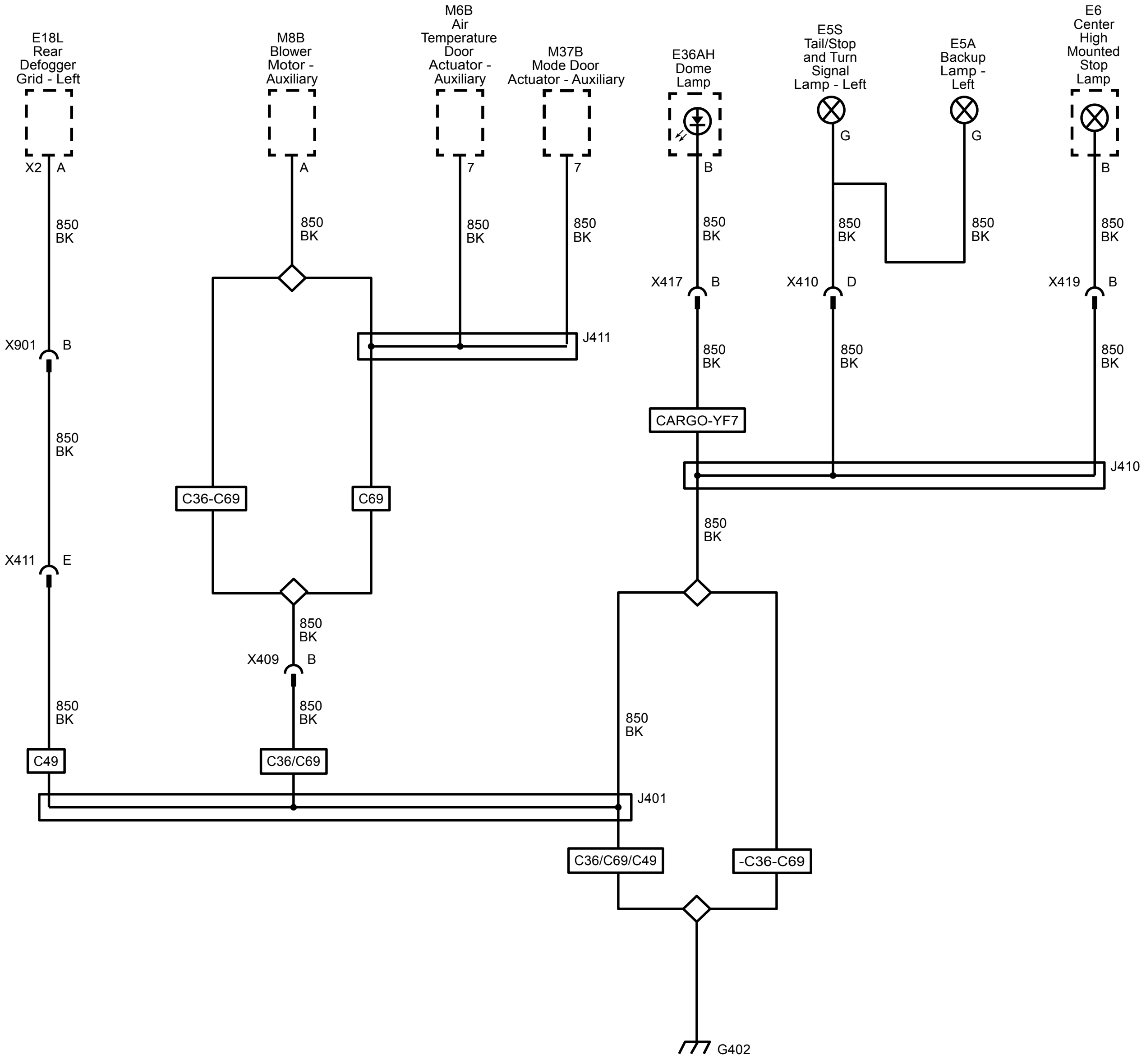
G350 and G400


K119 CNG Control Module
G12 Fuel Pump
Q53 Fuel Cut-Off Solenoid Valve
A7 Fuel Pump and Level Sensor Assembly
G7 Coolant Heater Fuel Pump
E19 Coolant Heater
G12 Fuel Pump
P3 Backup Alarm
G33 Reductant Pump
E52 Reductant Line Heater
X88 Trailer Connector
B212 Reductant Sensor Module
BK
BK
X1
H
X2
A
B
B
BK
BK
J430
A
1
150 BK
H
2
150 BK
B
1
417 BK
A
317 BK
B
A
B
150 BK
150 BK
X395
A4
B4
X395
C4
A1
BK
BK
X350
A
X350
A
X305
B
X316
E
(Not Used)
X405
G
FHZ
FHZ
KO7+UFM
-FHZ
BK
150 BK
150 BK
150 BK
150 BK
150 BK
150 BK
150 BK
150 BK
22 WH
150 BK
150 BK
X174
G
150 BK
UY7
K08
K08
LGH
8S3
LGH
LGH
UY7+8S3+NE7
LGH
LGH
J402
A32A LPG Pump Assembly - Primary
A32B LPG Pump Assembly - Secondary
4
B
BK
BK
J362
BK
150 BK
150 BK
150 BK
(CARGO/PASSENGER +L20/L96/LC8)-UY7
KO7+UFP
UY7/8S3/ (CARGO+LGH)
G350
G400

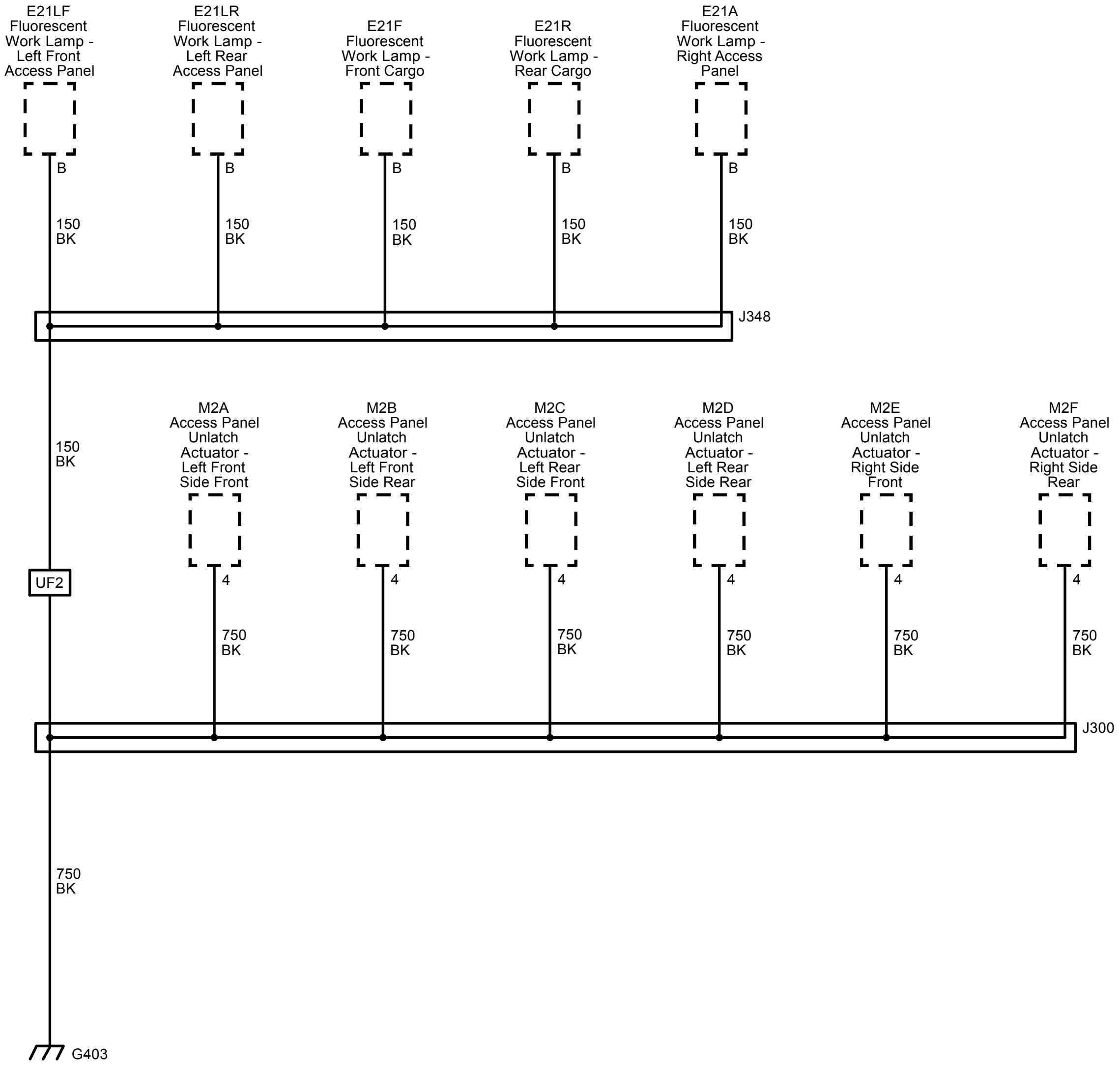
G401 (Passenger or Cargo)


M13 Door Latch Assembly - Rear Cargo
S13A Door Lock Switch - Rear Cargo
E18R Rear Defogger Grid - Right
E7 License Plate Lamp
E5T Tail/Stop and Turn Signal Lamp - Right
E5B Backup Lamp - Right
E37M Dome/ Reading Lamps - Middle
E37R Dome/ Reading Lamps - Rear
S34R HVAC Controls Switch Assembly - Auxiliary Rear
L O C
X1 A
E
X2 A
B
G
G
B
B
B
1051 BK/WH
1051 BK/WH
850 BK
1050 BK
1050 BK
1050 BK
X902 B
J901
J902
C69+REAR_HVAC_CONTROLS
J330
X420 D
-AU3
AU3
C49
-C49
X420 H
X400 D
X412 C
PASSENGER
J403
G401

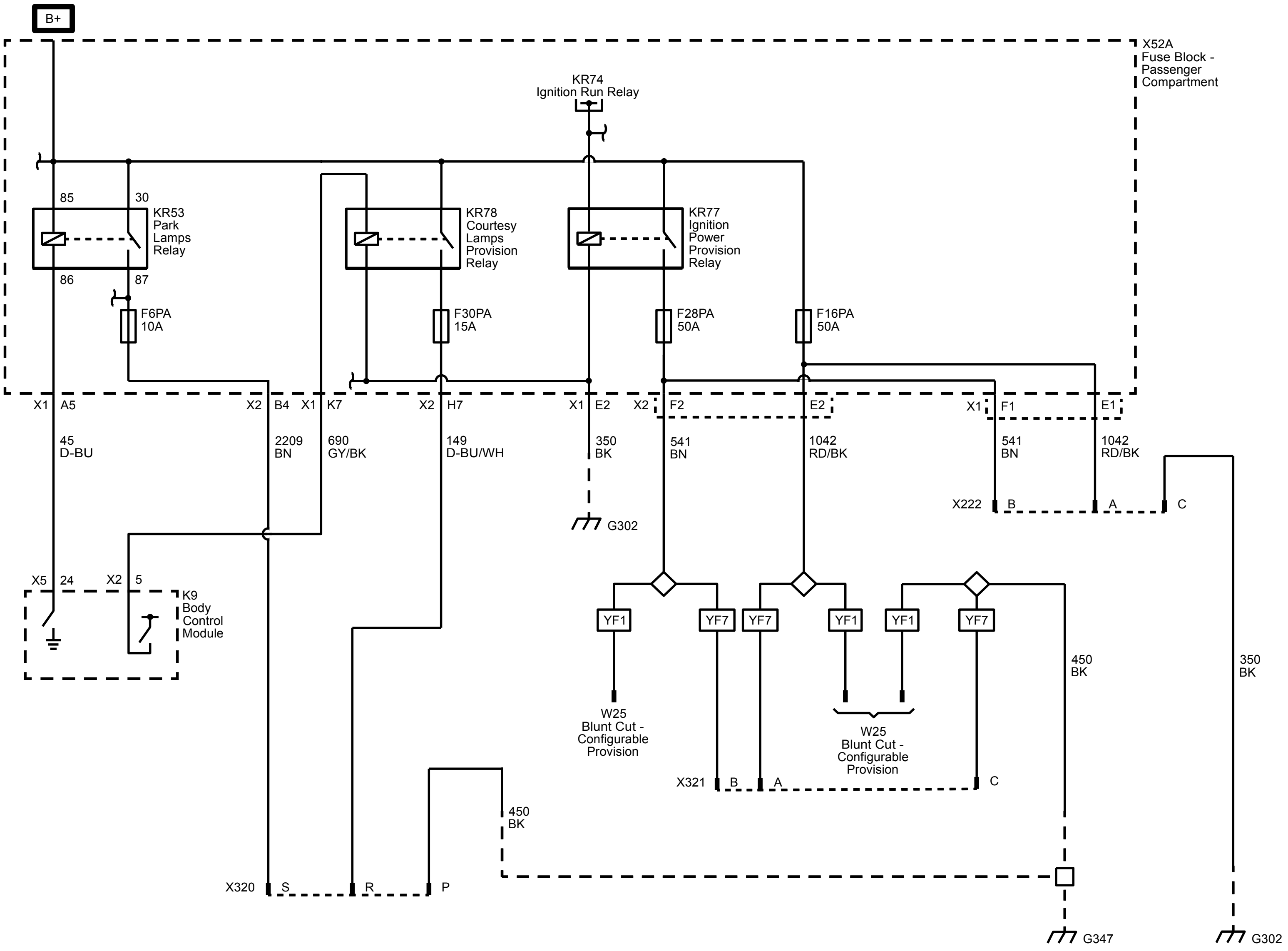
G402 (Passenger or Cargo)


E18L
Rear
Defogger
Grid - Left
X2
A
850
BK
X901
B
850
BK
X411
E
850
BK
C49
M8B
Blower
Motor -
Auxiliary
A
850
BK
C36-C69
C69
850
BK
X409
B
850
BK
C36/C69
M6B
Air
Temperature
Door
Actuator -
Auxiliary
7
850
BK
M37B
Mode Door
Actuator - Auxiliary
7
850
BK
J411
E36AH
Dome
Lamp
B
850
BK
X417
B
850
BK
CARGO-YF7
E5S
Tail/Stop
and Turn
Signal
Lamp - Left
G
850
BK
X410
D
850
BK
E5A
Backup
Lamp -
Left
G
850
BK
E6
Center
High
Mounted
Stop
Lamp
B
850
BK
X419
B
850
BK
J410
850
BK
850
BK
J401
C36/C69/C49
-C36-C69
G402

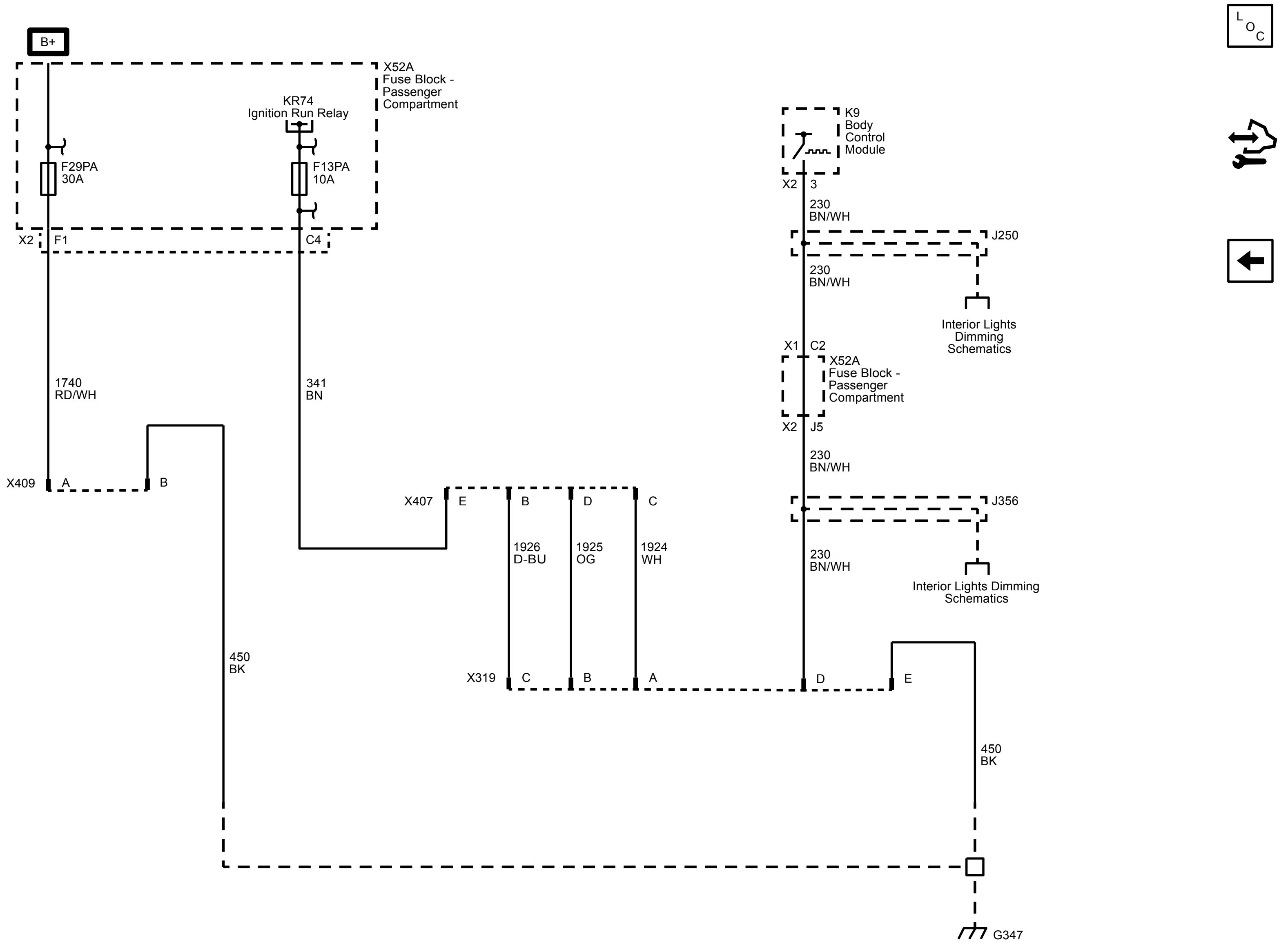
G403 (PRP)

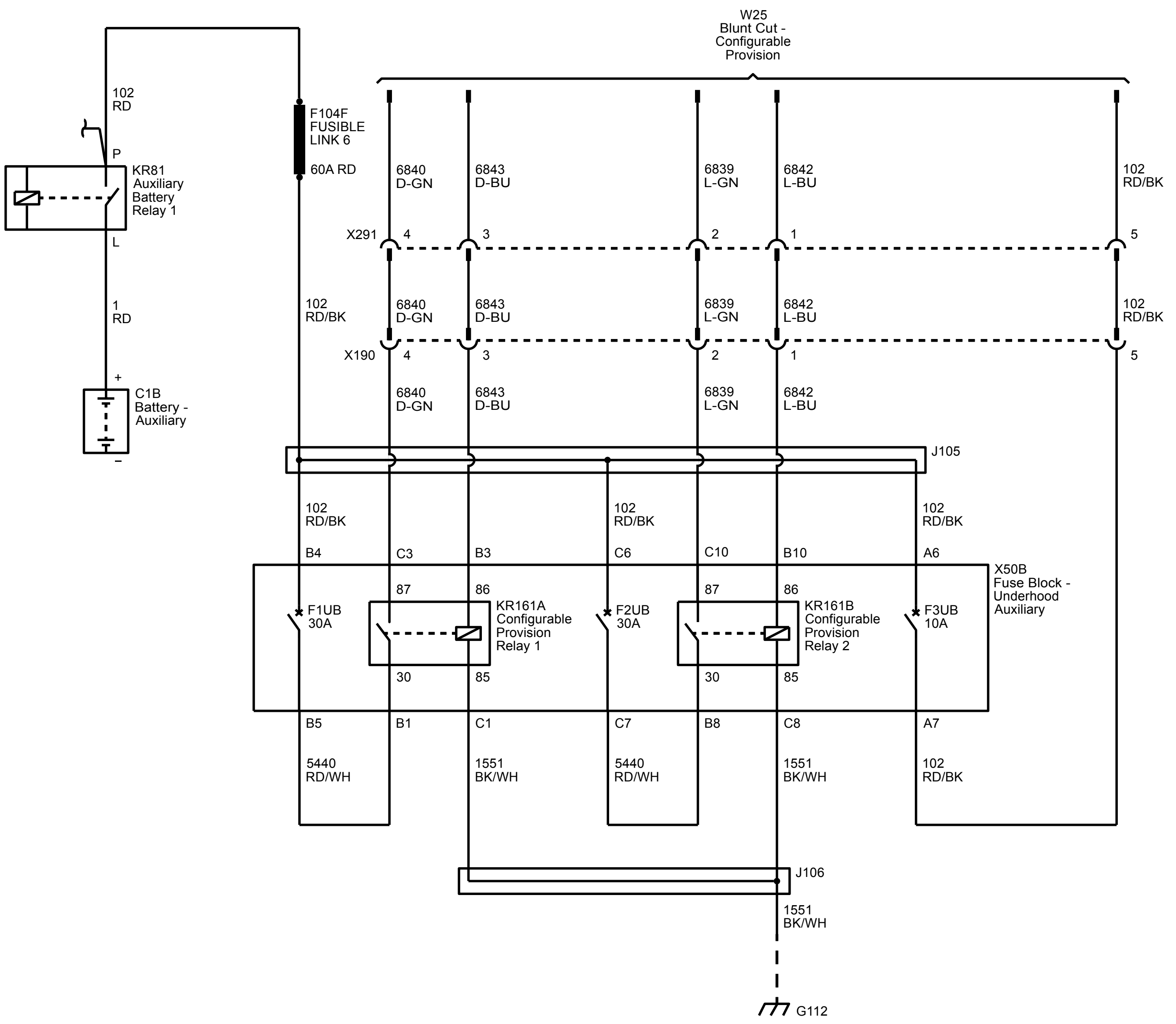

E21LF Fluorescent Work Lamp - Left Front Access Panel
E21LR Fluorescent Work Lamp - Left Rear Access Panel
E21F Fluorescent Work Lamp - Front Cargo
E21R Fluorescent Work Lamp - Rear Cargo
E21A Fluorescent Work Lamp - Right Access Panel
B
B
B
B
B
150 BK
150 BK
150 BK
150 BK
150 BK
J348
M2A Access Panel Unlatch Actuator - Left Front Side Front
M2B Access Panel Unlatch Actuator - Left Front Side Rear
M2C Access Panel Unlatch Actuator - Left Rear Side Front
M2D Access Panel Unlatch Actuator - Left Rear Side Rear
M2E Access Panel Unlatch Actuator - Right Side Front
M2F Access Panel Unlatch Actuator - Right Side Rear
150 BK
UF2
4
4
4
4
4
4
750 BK
750 BK
750 BK
750 BK
750 BK
750 BK
J300
750 BK
G403

Power, Ground, and Relay Controls


B+
KR74
Ignition Run Relay
X52A
Fuse Block -
Passenger
Compartment
85
30
KR53
Park
Lamps
Relay
86
87
KR78
Courtesy
Lamps
Provision
Relay
KR77
Ignition
Power
Provision
Relay
F6PA
10A
F30PA
15A
F28PA
50A
F16PA
50A
X1 A5
X2 B4
X1 K7
X2 H7
X1 E2
X2 F2
E2
X1 F1
E1
45
D-BU
2209
BN
690
GY/BK
149
D-BU/WH
350
BK
541
BN
1042
RD/BK
541
BN
1042
RD/BK
X222 B
A
C
G302
X5 24
X2 5
K9
Body
Control
Module
YF1
YF7
YF7
YF1
YF1
YF7
W25
Blunt Cut -
Configurable
Provision
W25
Blunt Cut -
Configurable
Provision
450
BK
350
BK
X321 B
A
C
450
BK
X320 S
R
P
G347
G302

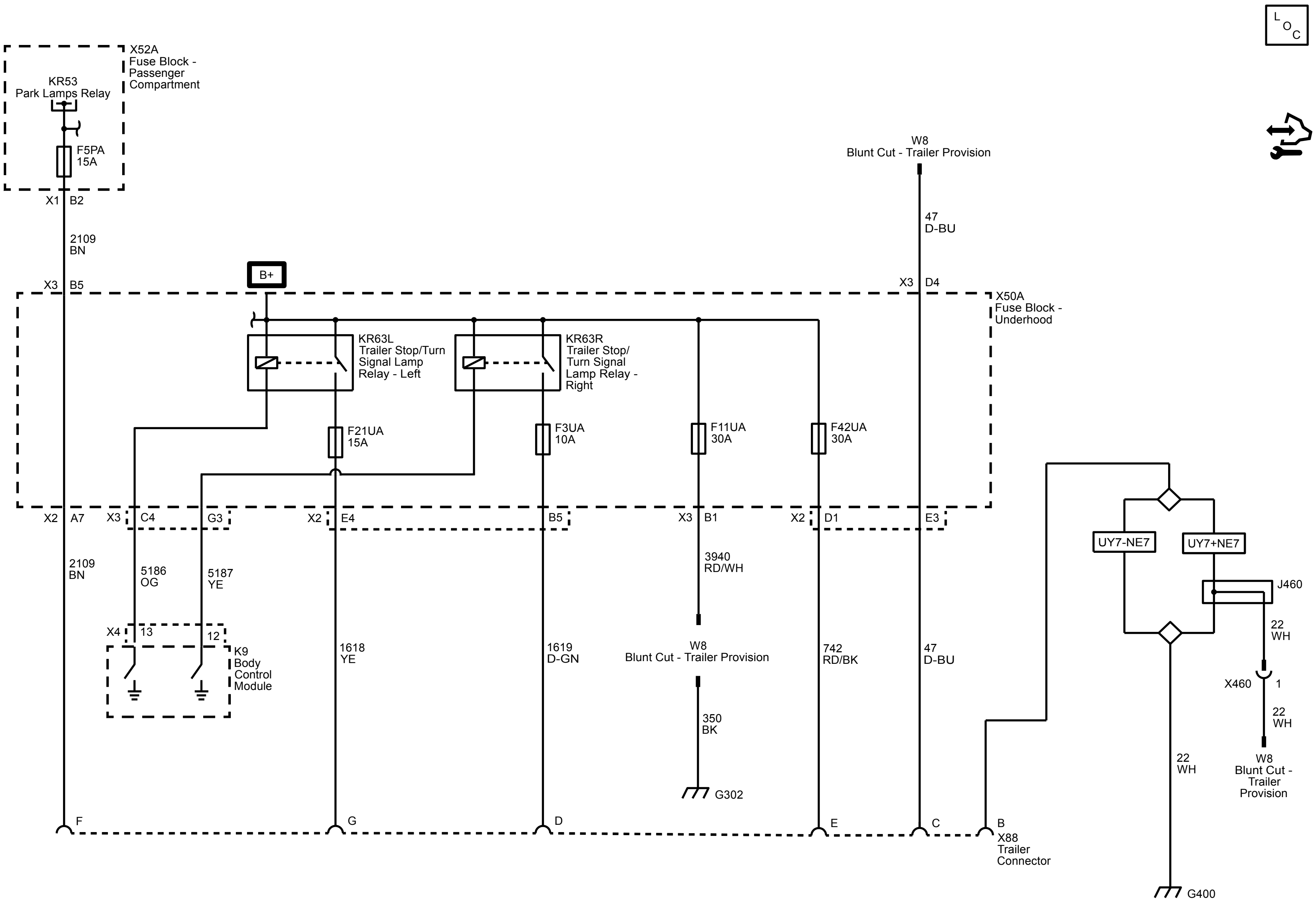
Rear Heat Auxiliary (ENC)


B+
X52A
Fuse Block -
Passenger
Compartment
KR74
Ignition Run Relay
F29PA
30A
F13PA
10A
X2
F1
C4
1740
RD/WH
341
BN
X409
A
B
450
BK
X407
E
B
D
C
1926
D-BU
1925
OG
1924
WH
X319
C
B
A
D
E
K9
Body
Control
Module
X2
3
230
BN/WH
J250
Interior Lights
Dimming
Schematics
X1
C2
X52A
Fuse Block -
Passenger
Compartment
X2
J5
J356
Interior Lights Dimming
Schematics
450
BK
G347
L
O
C

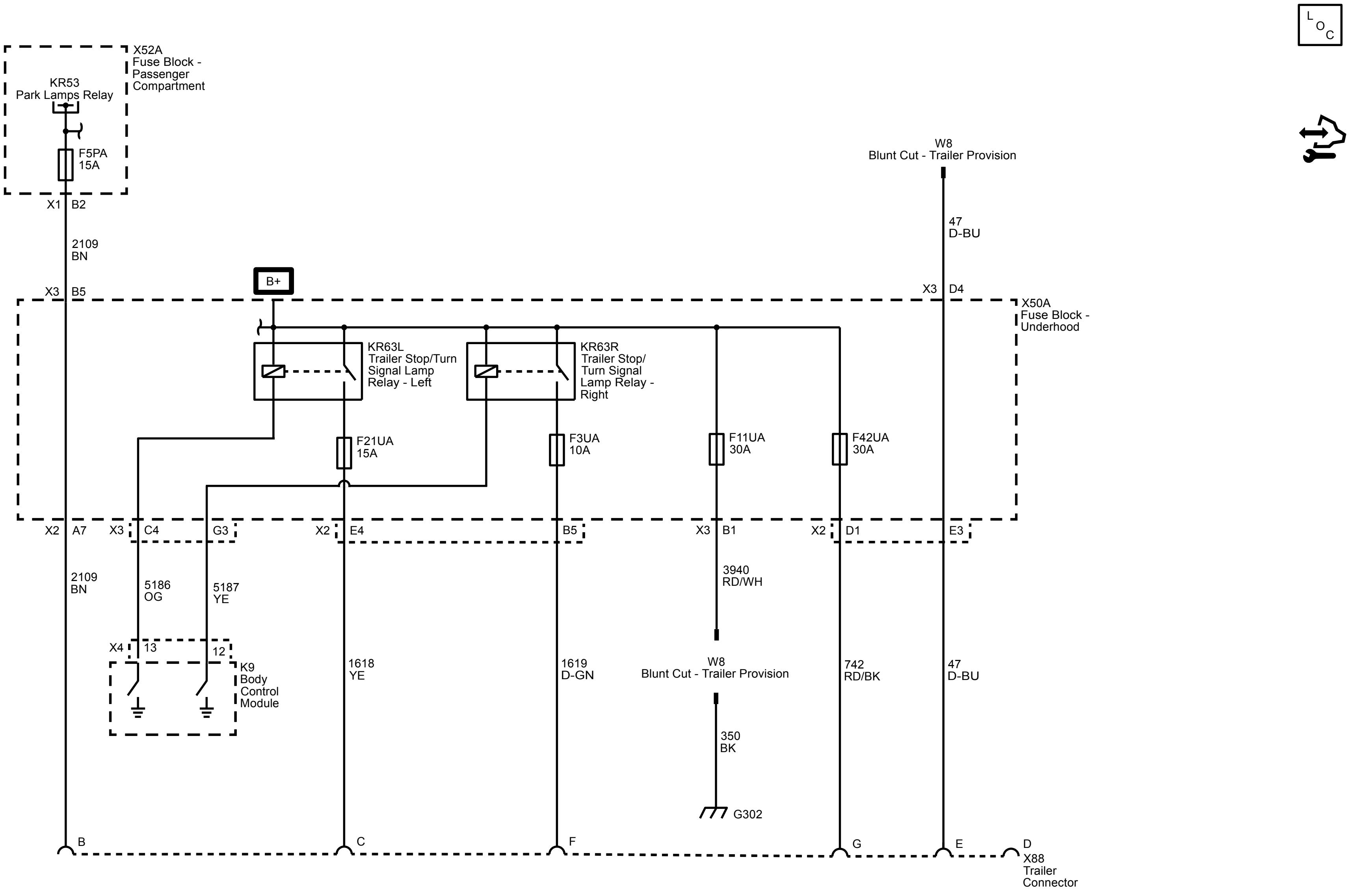

W25
Blunt Cut - Configurable Provision
102
RD
P
KR81 Auxiliary Battery Relay 1
L
1
RD
+
C1B Battery - Auxiliary
-
F104F FUSIBLE LINK 6
60A RD
102
RD/BK
6840
D-GN
6843
D-BU
6839
L-GN
6842
L-BU
102
RD/BK
X291
4
3
2
1
5
X190
4
3
2
1
5
J105
102
RD/BK
B4
C3
B3
C6
C10
B10
A6
X50B Fuse Block - Underhood Auxiliary
F1UB 30A
87
86
KR161A Configurable Provision Relay 1
30
85
F2UB 30A
87
86
KR161B Configurable Provision Relay 2
30
85
F3UB 10A
B5
B1
C1
C7
B8
C8
A7
5440
RD/WH
1551
BK/WH
102
RD/BK
J106
1551
BK/WH
G112

Trailer Connector/Provision Schematics

Trailer Connector/Provision (UY7 without NE7)


L O C
X52A
Fuse Block - Passenger Compartment
KR53
Park Lamps Relay
F5PA
15A
X1 B2
2109
BN
W8
Blunt Cut - Trailer Provision
47
D-BU
B+
X3 B5
X3 D4
X50A
Fuse Block - Underhood
KR63L
Trailer Stop/Turn Signal Lamp Relay - Left
KR63R
Trailer Stop/ Turn Signal Lamp Relay - Right
F21UA
15A
F3UA
10A
F11UA
30A
F42UA
30A
X2 A7
X3 C4
G3
X2 E4
B5
X3 B1
X2 D1
E3
2109
BN
5186
OG
5187
YE
3940
RD/WH
X4 13
12
K9
Body Control Module
1618
YE
1619
D-GN
W8
Blunt Cut - Trailer Provision
350
BK
G302
742
RD/BK
47
D-BU
UY7-NE7
UY7+NE7
J460
22
WH
X460
1
22
WH
W8
Blunt Cut - Trailer Provision
22
WH
F
G
D
E
C
B
X88
Trailer Connector
G400

Trailer Connector/Provision (UY7 with NE7)



L O C
X52A Fuse Block - Passenger Compartment
KR53 Park Lamps Relay
F5PA 15A
X1 B2
2109 BN
W8 Blunt Cut - Trailer Provision
47 D-BU
B+
X3 B5
X3 D4
X50A Fuse Block - Underhood
KR63L Trailer Stop/Turn Signal Lamp Relay - Left
KR63R Trailer Stop/ Turn Signal Lamp Relay - Right
F21UA 15A
F3UA 10A
F11UA 30A
F42UA 30A
X2 A7
X3 C4
G3
X2 E4
B5
X3 B1
X2 D1
E3
2109 BN
5186 OG
5187 YE
3940 RD/WH
X4 13
12
K9 Body Control Module
1618 YE
1619 D-GN
W8 Blunt Cut - Trailer Provision
742 RD/BK
47 D-BU
350 BK
G302
B
C
F
G
E
D
X88 Trailer Connector

Master Electrical Component List

Code	Name	Option	Location	Locator View	Connector End View
A3L	Sunshade - Left	DH6 with YF7	On the upper left of the headliner	—	*A3L Sunshade - Left (DH6 with YF7)*
A3R	Sunshade - Right	DH6	On the upper right of the headliner	—	*A3R Sunshade - Right (DH6)*
A5	Driver Information Center	—	Integral to P16 Instrument Cluster	—	*A5 Driver Information Center*
A7	Fuel Pump and Level Sensor Assembly	L20, L96, or LC8	In the vehicle underbody, in the fuel tank	• *Fuel Tank Components (Without NE7)* • *Fuel Tank Components (NE7)*	*A7 Fuel Pump and Level Sensor Assembly (L20 or L96)*
A9A	Outside Rearview Mirror - Driver	DEB or DE5	Attached to the exterior of the left front door	*Driver Door Components*	*A9A Outside Rearview Mirror - Driver (DEB or DE5)*
A9B	Outside Rearview Mirror - Passenger	DEB or DE5	Attached to the exterior of the right front door	*Front Passenger Door Components*	*A9B Outside Rearview Mirror - Passenger (DEB or DE5)*
A10	Inside Rearview Mirror	UVC	In the passenger compartment, mounted at the top center of the windshield	—	*A10 Inside Rearview Mirror (UVC)*
A11	Radio	Without UL5	In the center of the instrument panel	*Instrument Panel Components (1 of 2)*	• *A11 Radio X1 (UI8)* • *A11 Radio X1 (Without UI8)* • *A11 Radio X2 (Without UI8)* • *A11 Radio X4 (UI8)*
A12	Digital Radio Receiver Control Module	U2K or UBS	In the passenger compartment, mounted on a bracket under driver knee bolster panel	*Underside of Instrument Panel Components*	*A12 Digital Radio Receiver Control Module (U2K or UBS)*
A23D	Door Latch Assembly - Driver	—	Towards the rear of the driver door	*Driver Door Components*	• *A23D Door Latch Assembly - Driver X1* • *A23D Door Latch Assembly - Driver X2*
A23P	Door Latch Assembly - Passenger	—	Towards the rear of the passenger door	*Front Passenger Door Components*	*A23P Door Latch Assembly - Passenger X1*
A32A	LPG Pump Assembly - Primary	KO7 with UFP	Underneath vehicle, attached to front of primary fuel tank	—	*A32A LPG Pump Assembly - Primary (KO7 with UFP)*
A32B	LPG Pump Assembly - Secondary	KO7 with UFP	Underneath vehicle, attached to front of secondary fuel tank	—	*A32B LPG Pump Assembly - Secondary (KO7 with UFP)*
A39	Reductant Fluid Reservoir Assembly	LGH	Under the vehicle, above the reductant tank	—	—
A91	Mirror Display	UVC without UI8	Internal to A10 Inside Rearview Mirror	—	—
B1	A/C Refrigerant Pressure Sensor	C60	On the engine harness in the left rear side of the engine compartment	• *Front of Engine Compartment Components (1 of 2)* • *Engine Compartment Components (2 of 2, LGH)*	• *B1 A/C Refrigerant Pressure Sensor (C60 with L20, L96, or LC8)* • *B1 A/C Refrigerant Pressure Sensor (C60 with LGH)*

B1B	A/C Low Side Pressure Switch	C60	Right rear side of the engine compartment, on the side of the accumulator	• *Front of Engine Compartment Components (1 of 2)* • *Front of Engine Compartment Components (2 of 2, LGH)*	• *B1B A/C Low Pressure Switch (C60 with LGH)* • *B1B A/C Low Side Pressure Switch (C60 with L20, L96, or LC8)*
B5LF	Wheel Speed Sensor - Left Front	—	At the left front wheel	• *Front Wheel Speed Sensor Components* • *Frame and Underbody Components (1 of 2)*	*B5LF Wheel Speed Sensor - Left Front*
B5RF	Wheel Speed Sensor - Right Front	—	At the right front wheel	• *Front Wheel Speed Sensor Components* • *Frame and Underbody Components (1 of 2)*	*B5RF Wheel Speed Sensor - Right Front*
B5LR	Wheel Speed Sensor - Left Rear	JL4	At the left rear wheel, attached to the backing plate	*Frame and Underbody Components (1 of 2)*	*B5LR Wheel Speed Sensor - Left Rear (JL4)*
B5RR	Wheel Speed Sensor - Right Rear	JL4	At the right rear wheel, attached to the backing plate	*Frame and Underbody Components (1 of 2)*	*B5RR Wheel Speed Sensor - Right Rear (JL4)*
B9	Ambient Air Temperature Sensor	UFA	Attached to the front center of the radiator support	*Ambient Air Temperature Sensor (UFA)*	*B9 Ambient Air Temperature Sensor (UFA)*
B10	Ambient Light Sensor	—	On the top of the instrument panel	*Instrument Panel Components (2 of 2)*	*B10 Ambient Light Sensor*
B12A	Transmission Fluid Pressure Switch	—	Internal to T12 Automatic Transmission Assembly	—	—
B13	Transmission Fluid Temperature Sensor	—	Internal to T12 Automatic Transmission Assembly	—	—
B14A	Transmission Output Shaft Speed Sensor	—	Internal to T12 Automatic Transmission Assembly	*Automatic Transmission Internal Electrical Components*	*B14A Transmission Output Shaft Speed Sensor*
B14C	Transmission Input Shaft Speed Sensor	—	Internal to T12 Automatic Transmission Assembly	—	—
B15	Transmission Internal Mode Switch	—	Internal to T12 Automatic Transmission Assembly	*Automatic Transmission Internal Electrical Components*	—
B19A	Brake Booster Fluid Pressure Alarm Switch	UJ1	In the power steering inlet hose, near the power steering pump	*Brake Booster Fluid Alarm Switches (UJ1)*	*B19A Brake Booster Fluid Pressure Alarm Switch (UJ1)*
B20	Brake Fluid Level Switch	—	Left rear of the engine compartment, attached to the left lower side of the brake fluid reservoir	*Engine Compartment Components (1 of 2)*	*B20 Brake Fluid Level Switch*
B22	Brake Pedal Position Sensor	—	Attached to brake pedal assembly	*Instrument Panel Components (2 of 2)*	*B22 Brake Pedal Position Sensor*
B23	Camshaft Position Sensor	L20, L96, or LC8	Front of the engine between the water pump and the crank pulley	• *Right front of the Engine Components (LGH)* • *Left Front Side of the Engine Components (1 of 2, L20, L96, or LC8)* • *Left Front Side of the Engine Components (2 of 2, L20, L96, or LC8)*	• *B23 Camshaft Position Sensor (L20, L96, or LC8)* • *B23 Camshaft Position Sensor (LGH)*

B23	Camshaft Position Sensor	LGH	In the engine compartment, mounted to front engine cover above and to the right of the crankshaft	• *Right front of the Engine Components (LGH)* • *Left Front Side of the Engine Components (1 of 2, L20, L96, or LC8)* • *Left Front Side of the Engine Components (2 of 2, L20, L96, or LC8)*	• *B23 Camshaft Position Sensor (L20, L96, or LC8)* • *B23 Camshaft Position Sensor (LGH)*
B24	Cellular Phone Microphone	UE1 or UI8	In the passenger compartment, in the overhead console	—	*B24 Cellular Phone Microphone (UE1 or UI8)*
B26	Crankshaft Position Sensor	L20, L96 or LC8	Attached to the lower right rear side of the engine, behind the starter	• *Right Front Side of the Engine Components (2 of 2, L20, L96, or LC8)* • *Right front of the Engine Components (LGH)* • *Right Front Side of the Engine Components (1 of 2, L20, L96, or LC8)*	• *B26 Crankshaft Position Sensor (L20, L96, or LC8)* • *B26 Crankshaft Position Sensor (LGH)*
B26	Crankshaft Position Sensor	LGH	Mounted to the front engine cover to the right of the crankshaft	• *Right Front Side of the Engine Components (2 of 2, L20, L96, or LC8)* • *Right front of the Engine Components (LGH)* • *Right Front Side of the Engine Components (1 of 2, L20, L96, or LC8)*	• *B26 Crankshaft Position Sensor (L20, L96, or LC8)* • *B26 Crankshaft Position Sensor (LGH)*
B28F	Door Ajar Switch - Right Sliding	E24 or YA2	Mounted towards the bottom of the right rear door	• *Right Sliding Door Components (YA2)* • *Right Side Hinged Door Components (E24)*	*B28F Door Ajar Switch - Right Sliding*
B33	Engine Coolant Level Switch	LGH	Right front of the engine compartment, attached to the bottom of the coolant surge tank	• *Front of Engine Compartment Components (2 of 2, LGH)* • *Front of Engine Compartment Components (1 of 2)*	*B33 Engine Coolant Level Switch (LGH)*
B34	Engine Coolant Temperature Sensor	L20, L96 or LC8	On the left cylinder head at exhaust port 1	• *Top of the Engine Compoents (2 of 3, LGH)* • *Left Front Side of the Engine Components (2 of 2, L20, L96, or LC8)* • *Upper Left Side of the Engine Components (L20, L96, or LC8)*	• *B34 Engine Coolant Temperature Sensor (L20, L96, or LC8)* • *B34 Engine Coolant Temperature Sensor (LGH)*
B34	Engine Coolant Temperature Sensor	LGH	In the engine compartment, on the top left side of the engine	• *Top of the Engine Compoents (2 of 3, LGH)* • *Left Front Side of the Engine Components (2 of 2, L20, L96, or LC8)* • *Upper Left Side of the Engine Components (L20, L96, or LC8)*	• *B34 Engine Coolant Temperature Sensor (L20, L96, or LC8)* • *B34 Engine Coolant Temperature Sensor (LGH)*
B35	Engine Oil Level Switch	LGH	Attached to the left side of the oil pan	*Left Front of the Engine Components (LGH)*	*B35 Engine Oil Level Switch (LGH)*

B37B	Engine Oil Pressure Sensor	L20, L96, or LC8	In engine compartment, on the rear lower left side of the engine	• Right Front Side of the Engine Components (1 of 2, L20, L96, or LC8) • Left Front of the Engine Components (LGH)	• B37B Engine Oil Pressure Sensor (L20, L96, or LC8) • B37B Engine Oil Pressure Sensor (LGH)
B37B	Engine Oil Pressure Sensor	LGH	On the rear center of the engine	• Right Front Side of the Engine Components (1 of 2, L20, L96, or LC8) • Left Front of the Engine Components (LGH)	• B37B Engine Oil Pressure Sensor (L20, L96, or LC8) • B37B Engine Oil Pressure Sensor (LGH)
B46	Fuel Level Sensor	LGH	Under the vehicle, in the fuel tank	• Inside of Fuel Tank Components (LGH) • Frame and Underbody Components (2 of 2, LGH) • Undercar Components (LGH)	• B46 Fuel Level Sensor (KO7 with UFM) • B46 Fuel Level Sensor (LGH)
B46	Fuel Level Sensor	KO7 with UFM	Under the vehicle, mounted to fuel tank	• Inside of Fuel Tank Components (LGH) • Frame and Underbody Components (2 of 2, LGH) • Undercar Components (LGH)	• B46 Fuel Level Sensor (KO7 with UFM) • B46 Fuel Level Sensor (LGH)
B46A	Fuel Level Sensor - Primary	KO7 with UFP	Under the vehicle, in front of primary fuel tank	—	B46A Fuel Level Sensor - Primary (KO7 with UFP)
B46B	Fuel Level Sensor - Secondary	KO7 with UFP	Under the vehicle, in front of secondary fuel tank	—	B46B Fuel Level Sensor - Secondary (KO7 with UFP)
B47B	Fuel Rail Pressure Sensor	LGH	In the engine compartment, on top of the engine, mounted to the rear of the right fuel rail	• Top of the Engine Components (3 of 3, LGH) • Left Front of the Engine Components (LGH)	B47B Fuel Rail Pressure Sensor (LGH)
B48A	Fuel Temperature Sensor 1	LGH	In the engine compartment, on top of the engine, mounted to the left side of the fuel injection pump	Top of the Engine Compoents (2 of 3, LGH)	B48A Fuel Temperature Sensor 1 (LGH)
B48B	Fuel Temperature Sensor 2	LGH	In the engine compartment, on top of the engine, mounted to the rear of the left fuel rail	Left Front of the Engine Components (LGH)	B48B Fuel Temperature Sensor 2 (LGH)
B52C	Heated Oxygen Sensor - Bank 1 Sensor 1	L20, L96, or LC8	Attached to the left front exhaust pipe, front of the catalytic converter	Exhaust Components (L20, L96, or LC8)	• B52C Heated Oxygen Sensor - Bank 1 Sensor 1 (Cutaway with L96 or LC8) • B52C Heated Oxygen Sensor - Bank 1 Sensor 1 (Gas except Cutaway with L96 or LC8)
B52D	Heated Oxygen Sensor - Bank 1 Sensor 2	L20, L96, or LC8	Attached to the left front exhaust pipe, back of the catalytic converter	Exhaust Components (L20, L96, or LC8)	• B52D Heated Oxygen Sensor - Bank 1 Sensor 2 (Cutaway with L20 or L96) • B52D Heated Oxygen Sensor - Bank 1 Sensor 2 (Gas except Cutaway with L96 or LC8)
B52E	Heated Oxygen Sensor - Bank 2 Sensor 1	L20, L96, or LC8	Attached to the right front exhaust pipe, front of the catalytic converter	Exhaust Components (L20, L96, or LC8)	• B52E Heated Oxygen Sensor - Bank 2 Sensor 1 (Cutaway with L96 or LC8) • B52E Heated Oxygen Sensor - Bank 2 Sensor 1 (Gas except Cutaway with L96 or LC8)

B52F	Heated Oxygen Sensor - Bank 2 Sensor 2	L20, L96, or LC8	Attached to the right front exhaust pipe, rear of the catalytic converter	*Exhaust Components (L20, L96, or LC8)*	• *B52F Heated Oxygen Sensor - Bank 2 Sensor 2 (Cutaway with L20 or L96)* • *B52F Heated Oxygen Sensor - Bank 2 Sensor 2 (Gas except Cutaway with L96 or LC8)*
B55	Hood Ajar Switch	BTV	In the center front of the engine compartment, attached to the hood latch assembly	—	*B55 Hood Ajar Switch (BTV)*
B59	Front Impact Sensor	—	On the lower center of the radiator support	*Front of Engine Compartment Components (1 of 2)*	*B59 Front Impact Sensor*
B60	Passenger Presence Detection Sensor	AL0	On the passenger seat harness near the take out for the seat adjuster switch	*Passenger Seat Components*	*B60 Passenger Presence Sensor (AL0)*
B63LF	Side Impact Sensor - Left Front	ASF	In the left front side door	*Driver Door Components*	*B63LF Side Impact Sensor - Left Front (ASF)*
B63RF	Side Impact Sensor - Right Front	ASF	In the right front side door	*Front Passenger Door Components*	*B63RF Side Impact Sensor - Right Front (ASF)*
B63LR	Side Impact Sensor - Left Rear	ASF	In the left center of the vehicle behind the body panel trim	*Left Rear Cargo Area Components (Passenger or Cargo)*	*B63LR Side Impact Sensor - Left Rear (Passenger with ASF)*
B63RR	Side Impact Sensor - Right Rear	ASF	In the lower right side of the vehicle near the rear side door	• *Right Rear Frame Rail Components (Passenger with E24)* • *Right Rear Frame Rail Components (Passenger with YA2)*	• *B63RR Side Impact Sensor - Right Rear (Passenger with ASF with E24)* • *B63RR Side Impact Sensor - Right Rear (Passenger with ASF with YA2)*
B68A	Knock Sensor 1	L20, L96, or LC8	Mounted to the lower right side of the engine in-between the engine oil pan and the right bank exhaust manifold	• *Lower Right Side of the Engine Components (L20, L96, or LC8)* • *Right Front Side of the Engine Components (1 of 2, L20, L96, or LC8)*	*B68A Knock Sensor 1 (L20, L96, or LC8)*
B68B	Knock Sensor 2	L20, L96, or LC8	Mounted to the lower left of the engine, in-between the engine oil filter and the left bank exhaust manifold	*Left Front Side of the Engine Components (2 of 2, L20, L96, or LC8)*	*B68B Knock Sensor 2 (L20, L96, or LC8)*
B74	Manifold Absolute Pressure Sensor	L20, L96, or LC8	In the engine compartment, attached to the intake manifold, on top of the engine	• *Top of the Engine Components (L20, L96, or LC8)* • *Left Front Side of the Engine Components (2 of 2, L20, L96, or LC8)* • *Right Front Side of the Engine Components (1 of 2, L20, L96, or LC8)* • *Top of the Engine Components (1 of 3, LGH)* • *Right front of the Engine Components (LGH)*	• *B74 Manifold Absolute Pressure Sensor (L20, L96, or LC8)* • *B74 Manifold Absolute Pressure Sensor (LGH)*

B74	Manifold Absolute Pressure Sensor	LGH	In the engine compartment, attached to the intake manifold tube, between the engine and the air cooler outlet duct	• *Top of the Engine Components (L20, L96, or LC8)* • *Left Front Side of the Engine Components (2 of 2, L20, L96, or LC8)* • *Right Front Side of the Engine Components (1 of 2, L20, L96, or LC8)* • *Top of the Engine Components (1 of 3, LGH)* • *Right front of the Engine Components (LGH)*	• *B74 Manifold Absolute Pressure Sensor (L20, L96, or LC8)* • *B74 Manifold Absolute Pressure Sensor (LGH)*
B75B	Mass Air Flow/Intake Air Temperature Sensor	L20, L96, or LC8	Attached to the air intake duct, front of the engine compartment	• *Engine Compartment Components (2 of 2, LGH)* • *Top of the Engine Components (1 of 3, LGH)*	• *B75B Mass Air Flow/Intake Air Temperature Sensor (L20, L96, or LC8)* • *B75B Mass Air Flow/Intake Air Temperature Sensor (LGH)*
B75B	Mass Air Flow/Intake Air Temperature Sensor	LGH	In the engine compartment, attached to the air intake duct	• *Engine Compartment Components (2 of 2, LGH)* • *Top of the Engine Components (1 of 3, LGH)*	• *B75B Mass Air Flow/Intake Air Temperature Sensor (L20, L96, or LC8)* • *B75B Mass Air Flow/Intake Air Temperature Sensor (LGH)*
B75C	Multifunction Intake Air Sensor	LGH	Right front of the engine compartment, mounted in the air cleaner duct	—	*B75C Multifunction Intake Air Sensor (LGH)*
B78E	Rear Object Sensor - Left Middle	UD7	Left side of the bumper cover	*Rear Exterior Lights (Passenger or Cargo)*	*B78E Rear Object Sensor - Left Middle (UD7)*
B78F	Rear Object Sensor - Right Middle	UD7	Right side of the bumper cover	*Rear Exterior Lights (Passenger or Cargo)*	*B78F Rear Object Sensor - Right Middle (UD7)*
B78G	Rear Object Sensor - Left Outer	UD7	Left rear corner of the bumper cover	*Rear Exterior Lights (Passenger or Cargo)*	*B78G Rear Object Sensor - Left Outer (UD7)*
B78H	Rear Object Sensor - Right Outer	UD7	Right rear corner of the bumper cover	*Rear Exterior Lights (Passenger or Cargo)*	*B78H Rear Object Sensor - Right Outer (UD7)*
B80	Park Brake Switch	—	Left lower side of the instrument panel on the brake pedal assembly	*Instrument Panel Components (2 of 2)*	*B80 Park Brake Switch*
B87	Rearview Camera	UVC	On the right rear cargo door, in license plate trim	*Rear Exterior Lights (Passenger or Cargo)*	*B87 Rearview Camera (Cargo/Passenger)*
B88D	Seat Belt Switch - Driver	—	Right side of the driver seat, inside Seat Belt Buckle — Driver	—	—
B88P	Seat Belt Switch - Passenger	AK5	Left side of the front passenger seat, inside Seat Belt Buckle — Passenger	—	—
B99	Steering Wheel Angle Sensor	JL4	Attached the lower steering column jacket assembly	*Steering Column Components (2 of 2)*	*B99 Steering Wheel Angle Sensor (JL4)*
B107	Accelerator Pedal Position Sensor	—	Left lower side of the instrument panel, above the accelerator pedal	*Instrument Panel Components (2 of 2)*	*B107 Accelerator Pedal Position Sensor*
B112	Turbocharger Vane Position Sensor	LGH	In the engine compartment, mounted on the top of the turbocharger, between the front and rear turbocharger housings	• *Left Front of the Engine Components (LGH)* • *Top of the Engine Components (1 of 3, LGH)*	*B112 Turbocharger Vane Position Sensor (LGH)*

B116	Water in Fuel Sensor	LGH	Under the vehicle, internally attached to the top of the fuel pump assembly	—	*B116 Water in Fuel Sensor (LGH)*
B119	Multi-axis Acceleration Sensor	JL4	In the passenger compartment, on the front center on the floor board between the front seats	• *Frame and Underbody Components (1 of 2)* • *Left Front of Passenger Compartment Components*	*B119 Multi-axis Acceleration Sensor (JL4)*
B130A	Exhaust Gas Recirculation Temperature Sensor 1	LGH	In the engine compartment, on the top left rear side of the engine	*Left Front of the Engine Components (LGH)*	*B130A Exhaust Gas Recirculation Temperature Sensor 1 (LGH)*
B130B	Exhaust Gas Recirculation Temperature Sensor 2	LGH	In the engine compartment, on the top right front side of the engine	*Right front of the Engine Components (LGH)*	*B130B Exhaust Gas Recirculation Temperature Sensor 2 (LGH)*
B131A	Exhaust Temperature Sensor 1	LGH	In the engine compartment, attached to the exhaust pipe, on the top left rear side of the engine	*Right front of the Engine Components (LGH)*	*B131A Exhaust Temperature Sensor 1 (LGH)*
B131B	Exhaust Temperature Sensor 2	LGH	Under the vehicle, attached to the exhaust pipe, near the rear of the catalytic converter	—	*B131B Exhaust Temperature Sensor 2 (LGH)*
B131C	Exhaust Temperature Sensor 3	LGH	Under the vehicle, attached to the exhaust pipe, at the middle of the diesel particulate filter	*Exhaust Components (LGH)*	*B131C Exhaust Temperature Sensor 3 (Cargo/Passenger)*
B131D	Exhaust Temperature Sensor 4	LGH	Under the vehicle, attached to the exhaust pipe, near the rear of the diesel particulate filter	*Exhaust Components (LGH)*	*B131D Exhaust Temperature Sensor 4 (Cargo/Passenger)*
B133	Brake Booster Fluid Flow Alarm Switch	UJ1	In the power steering outlet hose, near the power steering pump	*Brake Booster Fluid Alarm Switches (UJ1)*	• *B133 Brake Booster Fluid Flow Alarm Switch X1 (UJ1)* • *B133 Brake Booster Fluid Flow Alarm Switch X2 (UJ1)*
B134A	Coolant Heater Air Temperature Sensor	K08	Internal to E19 Coolant Heater	*Coolant Heater Components (K08)*	—
B134B	Coolant Heater Combustion Sensor	K08	Internal to E19 Coolant Heater	*Coolant Heater Components (K08)*	—
B134C	Coolant Heater Overheat Sensor	K08	Internal to E19 Coolant Heater	*Coolant Heater Components (K08)*	—
B135	Coolant Heater Temperature Sensor	K08	Internal to E19 Coolant Heater	—	—
B136	Exhaust Particulate Matter Sensor	LGH	Mounted to the exhaust, towards the rear of the engine harness	—	*B136 Exhaust Particulate Matter Sensor (Cargo/Passenger)*
B150	Fuel Tank Pressure Sensor	L20 or L96	Attached to the top of the fuel sender assembly	• *Fuel Tank Components (NE7)* • *Fuel Tank Components (Without NE7)*	• *B150 Fuel Tank Pressure Sensor (FHZ)* • *B150 Fuel Tank Pressure Sensor (L20, L96, or LC8)*
B150	Fuel Tank Pressure Sensor	LC8	In the vehicle underbody, left side middle	• *Fuel Tank Components (NE7)* • *Fuel Tank Components (Without NE7)*	• *B150 Fuel Tank Pressure Sensor (FHZ)* • *B150 Fuel Tank Pressure Sensor (L20, L96, or LC8)*
B153D	Seat Belt Buckle - Driver	—	Right side of the driver seat	*Driver Seat Components*	*B153D Seat Belt Buckle - Driver*
B153P	Seat Belt Buckle - Passenger	AK5	Left side of the front passenger seat	*Passenger Seat Components*	*B153P Seat Belt Buckle - Passenger (AK5)*

B190	LPG Pressure and Temperature Sensor	KO7 with UFM	Attached to the LPG Harness	—	—
B193A	Charge Air Cooler Inlet Temperature Sensor	LGH	In the engine compartment, attached to the intake manifold, front of the turbocharger	*Left Front of the Engine Components (LGH)*	*B193A Charge Air Cooler Inlet Temperature Sensor (LGH)*
B193B	Charge Air Cooler Outlet Temperature Sensor	LGH	On the top right front of the engine compartment, near the coolant surge tank	*Front of Engine Compartment Components (2 of 2, LGH)*	*B193B Charge Air Cooler Outlet Temperature Sensor (LGH)*
B194	Reductant Pressure Sensor	LGH	Under the vehicle, above the reductant tank	*Reductant Tank Components*	*B194 Reductant Pressue Sensor (LGH)*
B195A	Nitrogen Oxides Sensor 1	LGH	Under the vehicle	*Left Front of the Engine Components (LGH)*	*B195A Nitrogen Oxides Sensor 1 (LGH)*
B195B	Nitrogen Oxides Sensor 2	LGH	Under the vehicle	*Exhaust Components (LGH)*	*B195B Nitrogen Oxides Sensor 2 (Cargo/Passenger)*
B198	Fuel Composition Sensor	L20, L96, or LC8	Under the vehicle	—	—
B203	Engine Coolant Radiator Temperature Sensor	L20, L96, or LC8	Mounted to the radiator	—	—
B212	Reductant Sensor Module	LGH	Under the vehicle, above the reductant tank	*Reductant Tank Components*	• *B212 Reductant Sensor Module X1 (LGH)* • *B212 Reductant Sensor Module X2 (LGH)*
B215	Fuel Filter Pressure Switch	LGH	In the engine compartment, on the top left rear side of the engine	*Left Front of the Engine Components (LGH)*	*B215 Fuel Filter Pressure Switch (LGH)*
B221	Alternative Fuel Tank Pressure Sensor	LC8	Attached to the CNG Harness	—	—
B259	Exhaust Pressure Sensor	LGH	Mounted to the exhaust	*Exhaust Components (LGH)*	*B259 Exhaust Pressure Sensor (Cargo/Passenger)*
C1	Battery	—	At the right front side of the engine compartment	• *Engine Compartment Components (1 of 2)* • *Front of Engine Compartment Components (2 of 2, LGH)*	*C1 Battery*
C1B	Battery - Auxiliary	LGH or TP2	Left frame rail, center of the vehicle	• *Frame and Underbody Components (2 of 2, LGH)* • *Undercar Components (LGH)*	*C1B Battery - Auxiliary (LGH or TP2)*
E2LF	Side Marker Lamp - Left Front	—	In the left front corner of the vehicle	• *Front Exterior Lighting (Base)* • *Front Exterior Lighting (Uplevel)*	*E2LF Side Marker Lamp - Left Front*
E2RF	Side Marker Lamp - Right Front	—	In the right front corner of the vehicle	• *Front Exterior Lighting (Base)* • *Front Exterior Lighting (Uplevel)*	*E2RF Side Marker Lamp - Right Front*
E4E	Headlamp - Left High Beam	V22	At the left front of the vehicle	*Front Exterior Lighting (Uplevel)*	*E4E Headlamp - Left High Beam (V22)*
E4F	Headlamp - Right High Beam	V22	At the right front of the vehicle	*Front Exterior Lighting (Uplevel)*	*E4F Headlamp - Right High Beam (V22)*
E4G	Headlamp - Left Low Beam	V22	At the left front of the vehicle	*Front Exterior Lighting (Uplevel)*	*E4G Headlamp - Left Low Beam (V22)*

E4H	Headlamp - Right Low Beam	V22	At the right front of the vehicle	*Front Exterior Lighting (Uplevel)*	*E4H Headlamp - Right Low Beam (V22)*
E4N	Park/Turn Signal Lamp - Left	—	In the left front corner of the vehicle	• *Front Exterior Lighting (Base)* • *Front Exterior Lighting (Uplevel)*	*E4N Park/Turn Signal Lamp - Left (V22)*
E4P	Park/Turn Signal Lamp - Right	—	In the right front corner of the vehicle	• *Front Exterior Lighting (Base)* • *Front Exterior Lighting (Uplevel)*	*E4P Park/Turn Signal Lamp - Right (V22)*
E5A	Backup Lamp - Left	—	Attached to the left tail lamp assembly	*Rear Exterior Lights (Passenger or Cargo)*	*E5A Backup Lamp - Left*
E5B	Backup Lamp - Right	—	Attached to the right tail lamp assembly	*Rear Exterior Lights (Passenger or Cargo)*	*E5B Backup Lamp - Right*
E5S	Tail/Brake and Turn Signal Lamp - Left	Passenger or Cargo	Attached to the left tail lamp assembly, upper bulb	*Rear Exterior Lights (Passenger or Cargo)*	*E5S Tail/Stop and Turn Signal Lamp - Left (Passenger or Cargo)*
E5T	Tail/Brake and Turn Signal Lamp - Right	Passenger or Cargo	Attached to the right tail lamp assembly, upper bulb	*Rear Exterior Lights (Passenger or Cargo)*	*E5T Tail/Stop and Turn Signal Lamp - Right (Passenger or Cargo)*
E6	Center High Mounted Stop Lamp	Passenger or Cargo	At the top rear center of the vehicle	*Rear Exterior Lights (Passenger or Cargo)*	*E6 Center High Mounted Stop Lamp (Passenger or Cargo)*
E7	License Plate Lamp	Passenger or Cargo	Attached to the outer right cargo door, above the license plate mount	*Rear Exterior Lights (Passenger or Cargo)*	*E7 License Plate Lamp (Passenger or Cargo)*
E12A	Glow Plug 1	LGH	Attached to the side of the right cylinder head, above the #1 cylinder	*Right front of the Engine Components (LGH)*	*E12A Glow Plug 1 (LGH)*
E12B	Glow Plug 2	LGH	Attached to the side of the left cylinder head, above the #2 cylinder	*Left Front of the Engine Components (LGH)*	*E12B Glow Plug 2 (LGH)*
E12C	Glow Plug 3	LGH	Attached to the side of the right cylinder head, above the #3 cylinder	*Right front of the Engine Components (LGH)*	*E12C Glow Plug 3 (LGH)*
E12D	Glow Plug 4	LGH	Attached to the side of the left cylinder head, above the #4 cylinder	*Left Front of the Engine Components (LGH)*	*E12D Glow Plug 4 (LGH)*
E12E	Glow Plug 5	LGH	Attached to the side of the right cylinder head, above the #5 cylinder	*Right front of the Engine Components (LGH)*	*E12E Glow Plug 5 (LGH)*
E12F	Glow Plug 6	LGH	Attached to the side of the left cylinder head, above the #6 cylinder	*Left Front of the Engine Components (LGH)*	*E12F Glow Plug 6 (LGH)*
E12G	Glow Plug 7	LGH	Attached to the side of the right cylinder head, above #7 cylinder	*Right front of the Engine Components (LGH)*	*E12G Glow Plug 7 (LGH)*
E12H	Glow Plug 8	LGH	Attached to the side of the left cylinder head, above the #8 cylinder	*Left Front of the Engine Components (LGH)*	*E12H Glow Plug 8 (LGH)*
E13L	Headlamp - Left	Without V22	At the left front of the vehicle	*Front Exterior Lighting (Base)*	*E13L Headlamp - Left (Without V22)*
E13R	Headlamp - Right	Without V22	At the right front of the vehicle	*Front Exterior Lighting (Base)*	*E13R Headlamp - Right (Without V22)*
E18L	Rear Defogger Grid - Left	C49	Attached to the left cargo door window	*Rear Door Components (Passenger or Cargo)*	• *E18L Rear Defogger Grid - Left (C49 with A18)* • *E18L Rear Defogger Grid - Left X1 (C49 with A12)* • *E18L Rear Defogger Grid - Left X2 (C49 with A12)*

E18R	Rear Defogger Grid - Right	C49	Attached to the right cargo door window	Rear Door Components (Passenger or Cargo)	- E18R Rear Defogger Grid - Right (C49 with A18) - E18R Rear Defogger Grid - Right X1 (C49 with A12) - E18R Rear Defogger Grid - Right X2 (C49 with A12)
E19	Coolant Heater	K08	Attached to the left front inner frame rail	- Undercar Components (LGH) - Frame and Underbody Components (2 of 2, LGH) - Coolant Heater Components (K08)	E19 Coolant Heater (K08)
E20	Coolant Heater Glow Plug	K08	Internal to E19 Coolant Heater	Coolant Heater Components (K08)	—
E21A	Fluorescent Work Lamp - Right Access Panel	PRP	Mounted towards the right of the top access panel	—	—
E21F	Fluorescent Work Lamp - Front Cargo	PRP	Mounted towards the top front of the cargo area	—	—
E21R	Fluorescent Work Lamp - Rear Cargo	PRP	Mounted towards the top rear of the cargo area	—	—
E21LF	Fluorescent Work Lamp - Left Front Access Panel	PRP	At the front and towards the top of the left access panel	—	—
E21LR	Fluorescent Work Lamp - Left Rear Access Panel	PRP	Mounted towards the top of the right access panel	—	—
E22	Underhood Lamp	—	In the engine compartment, attached to the left inner hood panel	Underside of Hood Components	E22 Underhood Lamp
E24	Intake Air Heater	LGH	In the engine compartment, between the intake manifold tube and the air cooler outlet duct	- Left Front of the Engine Components (LGH) - Top of the Engine Components (1 of 3, LGH)	- E24 Intake Air Heater X1 (LGH) - E24 Intake Air Heater X2 (LGH)
E31L	Sunshade Mirror Lamp - Left	C69 or DH6	On the upper left of the headliner, inside the Sunshade — Left	Headliner Components	—
E31R	Sunshade Mirror Lamp - Right	C69 or DH6	On the upper right of the headliner, in the Sunshade — Right	Headliner Components	—
E32	Cigarette Lighter Receptacle	DT4	Slightly below and to the left of the radio	Instrument Panel Components (1 of 2)	E32 Cigarette Lighter Receptacle (DT4)
E36AH	Dome Lamp	Cargo	In the rear of the roof panel	—	E36AH Dome Lamp (Cargo)
E37F	Dome/Reading Lamps - Front	Without YF7	In the front of the roof panel	Headliner Components	E37F Dome/Reading Lamps - Front (Without YF7)
E37M	Dome/Reading Lamps - Middle	Passenger	In the center of the roof panel	Headliner Components	E37M Dome/Reading Lamps - Middle (Passenger)
E37R	Dome/Reading Lamps - Rear	Passenger	In the rear of the roof panel	Headliner Components	E37R Dome/Reading Lamps - Rear (Passenger)
E52	Reductant Line Heater	LGH	Under the vehicle, above the reductant tank	Reductant Tank Components	E52 Reductant Line Heater (LGH)
E53	Reductant Tank Heater	LGH	Under the vehicle, inside the reductant tank	—	E53 Reductant Tank Heater (LGH)

F101	Passenger Instrument Panel Air Bag	—	Right side of the instrument panel	• *Instrument Panel Components (1 of 2)* • *Instrument Panel Components (2 of 2)*	*F101 Passenger Instrument Panel Air Bag*
F104A	Fusible Link 1	LGH	In-between C1 Battery and K34 Glow Plug Control Module	—	—
F104B	Fusible Link 2	—	Adjacent to X50A Fuse Block - Underhood	—	—
F104C	Fusible Link 3	—	In-between C1 Battery and G13 Generator	—	—
F104D	Fusible Link 4	LGH	In-between X60A Junction Block - Underhood and E24 Intake Air Heater	—	—
F104E	Fusible Link 5	LGH with KD9	In-between X60A Junction Block - Underhood and G13E Generator - Auxiliary	—	—
F105LF	Roof Rail Air Bag - Left Front	ASF	Behind the left side of the headliner trim	*Left Front of Passenger Compartment Components*	*F105LF Roof Rail Air Bag - Left Front (ASF)*
F105RF	Roof Rail Air Bag - Right Front	ASF	Behind the right side of the headliner trim	*Left Front of Passenger Compartment Components*	*F105RF Roof Rail Air Bag - Right Front (ASF)*
F105RR	Roof Rail Air Bag - Right Rear	ASF with YA2	Behind the right rear side of the headliner trim	*Left Front of Passenger Compartment Components*	*F105RR Roof Rail Air Bag - Right Rear (ASF with YA2)*
F106D	Seat Side Air Bag - Driver	AK5	Within the driver seat back, towards the outside	—	—
F106P	Seat Side Air Bag - Passenger	AK5	Within the passenger seat back, towards the outside	—	—
F107	Steering Wheel Air Bag	—	Attached to the center of the steering wheel	• *Instrument Panel Components (1 of 2)* • *Steering Column Components (1 of 2)*	*F107 Steering Wheel Air Bag*
F109D	Seat Belt Buckle Pretensioner - Driver	—	Part of the seat belt buckle	*Driver Seat Components*	*F109D Seat Belt Buckle Pretensioner - Driver*
F109P	Seat Belt Buckle Pretensioner - Passenger	AK5	Part of the seat belt buckle	*Passenger Seat Components*	*F109P Seat Belt Buckle Pretensioner - Passenger (AK5)*
G7	Coolant Heater Fuel Pump	K08	Attached to the left inner frame rail, near the fuel pump assembly	• *Undercar Components (LGH)* • *Frame and Underbody Components (2 of 2, LGH)* • *Coolant Heater Components (K08)*	*G7 Coolant Heater Fuel Pump (LGH with K08)*
G10	Cooling Fan Motor	LGH	In the engine compartment, attached to the water pump pulley	*Front of Engine Compartment Components (1 of 2)*	*G10 Cooling Fan Motor (LGH)*
G12	Fuel Pump	LGH	Under the vehicle, internally attached to the middle of the fuel pump assembly	• *Undercar Components (LGH)* • *Frame and Underbody Components (2 of 2, LGH)*	• *G12 Fuel Pump (KO7 with UFM)* • *G12 Fuel Pump (LGH)*
G12	Fuel Pump	KO7 with UFM	Under the vehicle, mounted to fuel tank	• *Undercar Components (LGH)* • *Frame and Underbody Components (2 of 2, LGH)*	• *G12 Fuel Pump (KO7 with UFM)* • *G12 Fuel Pump (LGH)*

G12A	Fuel Pump - Primary	KO7 with UFP	Underneath vehicle, attached to front of primary fuel tank	—	—
G12B	Fuel Pump - Secondary	KO7 with UFP	Underneath vehicle, attached to front of primary fuel tank	—	—
G13	Generator	—	Attached to the right front of the engine	• *Left Front of the Engine Components (LGH)* • *Left Front Side of the Engine Components (2 of 2, L20, L96, or LC8)* • *Right front of the Engine Components (LGH)*	• *G13 Generator X1* • *G13 Generator X2*
G13E	Generator - Auxiliary	LGH with KD9	Attached to the left front of the engine	—	• *G13E Generator - Auxiliary X1 (LGH with KD9)* • *G13E Generator - Auxiliary X2 (LGH with KD9)*
G24	Windshield Washer Pump	—	Attached to the windshield washer fluid reservoir in the right front of the engine compartment	*Front of Engine Compartment Components (1 of 2)*	*G24 Windshield Washer Pump*
G25	LPG Tank Scavange Pump	KO7 with UFP	Attached to the LPG Harness	—	—
G33	Reductant Pump	LGH	Under the vehicle, above the reductant tank	*Reductant Tank Components*	*G33 Reductant Pump (LGH)*
G34	Evaporative Emission System Leak Detection Pump	LGH	In the right front lower side of the engine compartment, below the battery	• *Engine Compartment Components (1 of 2)* • *Front of Engine Compartment Components (2 of 2, LGH)*	• *G34 Evaporative Emission System Leak Detection Pump (KO7 with UFM)* • *G34 Evaporative Emission System Leak Detection Pump (LGH)*
G34	Evaporative Emission System Leak Detection Pump	KO7 with UFM	Underneath the vehicle, inside the LPG Evaporative Emissions (EVAP) box	• *Engine Compartment Components (1 of 2)* • *Front of Engine Compartment Components (2 of 2, LGH)*	• *G34 Evaporative Emission System Leak Detection Pump (KO7 with UFM)* • *G34 Evaporative Emission System Leak Detection Pump (LGH)*
K9	Body Control Module	—	Lower right side of the instrument panel behind the knee bolster	*Instrument Panel Components (2 of 2)*	• *K9 Body Control Module X1* • *K9 Body Control Module X2* • *K9 Body Control Module X3* • *K9 Body Control Module X4* • *K9 Body Control Module X5* • *K9 Body Control Module X6* • *K9 Body Control Module X7*
K10	Coolant Heater Control Module	K08	Internal to the coolant heater assembly	*Coolant Heater Components (K08)*	—
K17	Electronic Brake Control Module	—	Attached to the left frame rail, near the center of the vehicle	*Frame and Underbody Components (1 of 2)*	• *K17 Electronic Brake Control Module (JL4)* • *K17 Electronic Brake Control Module (Without JL4)*
K18	Compass Module	U80	In the front of the headliner	*Headliner Components*	*K18 Compass Module (U80)*

K20	Engine Control Module	—	At the left front side of the engine compartment, near the underhood fuse block on the inner left front fender	- *Engine Compartment Components (2 of 2, LGH)* - *Engine Compartment Components (1 of 2)*	- *K20 Engine Control Module X1 (L20, L96, or LC8)* - *K20 Engine Control Module X1 (LGH)* - *K20 Engine Control Module X2 (L20, L96, or LC8)* - *K20 Engine Control Module X2 (LGH)* - *K20 Engine Control Module X3 (LGH)*
KR23B	Fuel Pump Relay - Secondary	KO7 with UFP	Under the vehicle, mounted in front of the fuel tank, inside the tank control box	—	*KR23B Fuel Pump Relay - Secondary (KO7 with UFP)*
KR23C	Fuel Pump Relay - Primary	KO7 with UFP	Under the vehicle, mounted in front of the fuel tank, inside the tank control box	—	*KR23C Fuel Pump Relay - Primary (KO7 with UFP)*
KR32B	Blower Motor High Speed Relay - Auxiliary	C36, C69, or ENC	In the left rear of the passenger compartment, attached to the auxiliary HVAC module	*Left Rear Cargo Area Components (Passenger or Cargo)*	*KR32B Blower Motor High Speed Relay - Auxiliary*
KR32C	Blower Motor Low Speed Relay - Auxiliary	C36, C69, or ENC	In the left rear of the passenger compartment, attached to the auxiliary HVAC module	*Left Rear Cargo Area Components (Passenger or Cargo)*	*KR32C Blower Motor Low Speed Relay - Auxiliary*
KR32D	Blower Motor Medium Speed Relay - Auxiliary	C36, C69, or ENC	In the left rear of the passenger compartment, attached to the auxiliary HVAC module	*Left Rear Cargo Area Components (Passenger or Cargo)*	*KR32D Blower Motor Medium Speed Relay - Auxiliary*
K34	Glow Plug Control Module	LGH	Left rear of the engine, above the rocker cover to the left of the turbocharger	*Left Front of the Engine Components (LGH)*	- *K34 Glow Plug Control Module X1 (LGH)* - *K34 Glow Plug Control Module X2 (LGH)*
K36	Inflatable Restraint Sensing and Diagnostic Module	—	Below the driver seat under the carpet on the floor board	*Left Front of Passenger Compartment Components*	*K36 Inflatable Restraint Sensing and Diagnostic Module*
K41R	Rear Parking Assist Control Module	UD7	In the passenger compartment, under instrument panel upper trim panel, center of dash	—	- *K41R Rear Parking Assist Control Module X1 (UD7)* - *K41R Rear Parking Assist Control Module X2 (UD7)*
K64	Content Theft Deterrent Control Module	—	In the steering column around the ignition key cylinder housing	*Steering Column Components (1 of 2)*	*K64 Content Theft Deterrent Control Module*
K71	Transmission Control Module	—	Internal to T12 Automatic Transmission Assembly	*Engine Compartment Components (1 of 2)*	*K71 Transmission Control Module*
K73	Telematics Communication Interface Control Module	UE1	In the passenger compartment, mounted on a bracket under driver knee bolster panel	*Underside of Instrument Panel Components*	- *K73 Telematics Communication Interface Control Module X1 (UE1)* - *K73 Telematics Communication Interface Control Module X2 (UE1)* - *K73 Telematics Communication Interface Control Module X3 (UE1)*
K77	Remote Control Door Lock Receiver	ATG or UJM	Attached to the upper left side of the instrument panel carrier, above the instrument panel cluster (IPC)	*Instrument Panel Components (2 of 2)*	*K77 Remote Control Door Lock Receiver (ATG or UJM)*
K103	Fuel Injector Control Module	KO7 with UFP	Underneath vehicle, attached to tank control box, on driver’s side frame rail	—	- *K103 LPG Control Module (KO7 with UFM)* - *K103 LPG Control Module (KO7 with UFP)*

K103	Fuel Injector Control Module	KO7 with UFM	In the passenger compartment, mounted on a bracket under driver knee bolster panel, above interior engine cover	—	• *K103 LPG Control Module (KO7 with UFM)* • *K103 LPG Control Module (KO7 with UFP)*
K119	CNG Control Module	FHZ	In the vehicle underbody, left side, forward of the left rear spring, mounted to inboard side of left frame rail	—	• *K119 CNG Control Module X1 (FHZ)* • *K119 CNG Control Module X2 (FHZ)* • *K119 CNG Control Module X3 (FHZ)* • *K119 CNG Control Module X4 (FHZ)*
KR142	LPG Tank Scavange Pump Relay	KO7 with UFP	Integral to the LPG Harness	—	*KR142 LPG Tank Scavange Pump Relay (KO7 with UFP)*
KR143	Wait to Start Indicator Relay	KO7 with UFM	In the engine compartment, beside brake booster, tied to engine harness	—	*KR143 Wait to Start Indicator Relay (KO7 with UFM)*
KR152	LPG Bypass Solenoid Valve Relay	KO7 with UFM	Underneath the vehicle, mounted to the side of the EVAP vacuum pump housing box, towards the center of the vehicle, facing the driveshaft	—	*KR152 LPG Bypass Solenoid Valve Relay (KO7 with UFM)*
M2A	Access Panel Unlatch Actuator - Left Front Side Front	PRP	Inside the left access panel area	—	—
M2B	Access Panel Unlatch Actuator - Left Front Side Rear	PRP	Inside the left access panel area	—	—
M2C	Access Panel Unlatch Actuator - Left Rear Side Front	PRP	Inside the left access panel area	—	—
M2D	Access Panel Unlatch Actuator - Left Rear Side Rear	PRP	Inside the left access panel area	—	—
M2E	Access Panel Unlatch Actuator - Right Side Front	PRP	Inside the right access panel area	—	—
M2F	Access Panel Unlatch Actuator - Right Side Rear	PRP	Inside the right access panel area	—	—
M6	Air Temperature Door Actuator	—	Lower right side of the instrument panel, attached to the HVAC module	*HVAC Case Components*	*M6 Air Temperature Door Actuator*
M6B	Air Temperature Door Actuator - Auxiliary	C69	In the left rear of the passenger compartment, attached to the auxiliary HVAC module	*Left Rear Cargo Area Components (Passenger or Cargo)*	*M6B Air Temperature Door Actuator - Auxiliary (C69)*
M7	Transmission Shift Lock Control Solenoid Actuator	—	Attached to the right side of the steering column	*Steering Column Components (1 of 2)*	*M7 Transmission Shift Lock Control Solenoid Actuator*
M8	Blower Motor	—	Right rear of the engine compartment, attached to the evaporator case	*Engine Compartment Components (1 of 2)*	—
M8B	Blower Motor - Auxiliary	C36 or C69	In the left rear of the passenger compartment, attached to the auxiliary HVAC module	*Left Rear Cargo Area Components (Passenger or Cargo)*	—
M11	Coolant Heater Blower Motor	K08	Internal to the coolant heater assembly	*Coolant Heater Components (K08)*	—
M13	Door Latch Assembly - Rear Cargo	Passenger or Cargo	Attached to the right cargo door latch, in the right cargo door	*Rear Door Components (Passenger or Cargo)*	—

M14RR	Door Lock Actuator - Right Rear	AU3	Attached to the right rear door latch, in the right rear door	• *Right Sliding Door Components (YA2)* • *Right Side Hinged Door Components (E24)*	—
M37B	Mode Door Actuator - Auxiliary	C69	In the left rear of the passenger compartment, attached to the auxiliary HVAC module	*Left Rear Cargo Area Components (Passenger or Cargo)*	—
M49D	Seat Motor Assembly - Driver	AG1	Below the left front seat, attached to the seat frame	*Driver Seat Components*	—
M49P	Seat Motor Assembly - Passenger	AG2	Below the right front seat, attached to the seat frame	*Passenger Seat Components*	—
M64	Starter Motor	—	Attached to the lower right rear of the engine	• *Right front of the Engine Components (LGH)* • *Right Front Side of the Engine Components (2 of 2, L20, L96, or LC8)* • *Right Front Side of the Engine Components (1 of 2, L20, L96, or LC8)*	• *M64 Starter Motor X2 (L20, L96, or LC8)* • *M64 Starter Motor X2 (LGH)*
M74D	Window Motor - Driver	A31	Attached to the interior of the left front door	*Driver Door Components*	*M74D Window Motor - Driver (A31)*
M74P	Window Motor - Passenger	A31	Attached to the interior of the right front door	*Front Passenger Door Components*	*M74P Window Motor - Passenger (A31)*
M75	Windshield Wiper Motor	—	In the left side of the cowl, near the engine compartment	*Front of Engine Compartment Components (1 of 2)*	*M75 Windshield Wiper Motor*
P3	Backup Alarm	8S3	In the rear of the vehicle on the frame	—	*P3 Backup Alarm (8S3)*
P5	Chime Alarm Control Module	UL5	In the center of the instrument panel behind the radio	*Instrument Panel Components (2 of 2)*	*P5 Chime Alarm Control Module (UL5)*
P9	Driver Information Center Display	—	Integral to P16 Instrument Cluster	—	—
P13	Horn Assembly	—	In the left front engine compartment behind the left headlamp	• *Engine Compartment Components (2 of 2, LGH)* • *Front of Engine Compartment Components (1 of 2)*	• *P13 Horn Assembly (L20, L96, or LC8)* • *P13 Horn Assembly (LGH)*
P14	Passenger Air Bag Disabled Indicator	AL0	In the center of the instrument panel	*Instrument Panel Components (1 of 2)*	*P14 Passenger Air Bag Disable Indicator (AL0)*
P16	Instrument Cluster	—	Attached to the left side of the instrument panel	*Instrument Panel Components (1 of 2)*	*P16 Instrument Cluster*
P19AG	Speaker - Left Front Door	—	Attached to the left front door	*Driver Door Components*	*P19AG Speaker - Left Front Door*
P19AH	Speaker - Right Front Door	—	Attached to the right front door	*Front Passenger Door Components*	*P19AH Speaker - Right Front Door*
P19LR	Speaker - Left Rear Roof	Cargo or Passenger	In the left rear headliner of the vehicle	*Rear Door Components (Passenger or Cargo)*	*P19LR Speaker - Left Rear Roof (Passenger or Cargo)*
P19RR	Speaker - Right Rear Roof	Cargo or Passenger	In the right rear upper headliner of the vehicle	*Rear Door Components (Passenger or Cargo)*	*P19RR Speaker - Right Rear Roof (Passenger or Cargo)*
P19F	Speaker - Left Rear Cargo Door	US8	Attached to the left cargo door	*Rear Door Components (Passenger or Cargo)*	*P19F Speaker - Left Rear Cargo Door (US8)*
P19T	Speaker - Right Rear Cargo Door	US8	Attached to the right cargo door	*Rear Door Components (Passenger or Cargo)*	*P19T Speaker - Right Rear Cargo Door (US8)*

P44	Wait to Start Indicator	KO7	In the passenger compartment, attached to the instrument panel, left of steering column, under DIC controls	—	P44 Wait to Start Indicator (KO7)
Q1A	1-2 Shift Solenoid Valve	—	Internal T12 Automatic Transmission Assembly	—	Q1A 1-2 Shift Solenoid Valve
Q1B	2-3 Shift Solenoid Valve	—	Internal T12 Automatic Transmission Assembly	—	Q1B 2-3 Shift Solenoid Valve
Q2	A/C Compressor Clutch	C60	On the front of the A/C compressor lower right front of engine	• Right Front Side of the Engine Components (2 of 2, L20, L96, or LC8) • Left Front of the Engine Components (LGH) • Front of Engine Compartment Components (1 of 2)	• Q2 A/C Compressor Clutch (C60 with L20, L96, or LC8) • Q2 A/C Compressor Clutch (C60 with LGH)
Q6	Camshaft Position Actuator Solenoid Valve	L20, L96, or LC8	Front of the engine behind the center of the water pump	Left Front Side of the Engine Components (1 of 2, L20, L96, or LC8)	Q6 Camshaft Position Actuator Solenoid Valve (L20, L96, or LC8)
Q8	Control Solenoid Valve Assembly	—	Internal to T12 Automatic Transmission Assembly	Automatic Transmission Internal Electrical Components	• Q8 Control Solenoid Valve Assembly X1 (L20, L96, or LC8) • Q8 Control Solenoid Valve Assembly X1 (LGH) • Q8 Control Solenoid Valve Assembly X2 • Q8 Control Solenoid Valve Assembly X3
Q12	Evaporative Emission Purge Solenoid Valve	L20, L96, or LC8	On the top of the engine, rear of the throttle body	• Top of the Engine Components (L20, L96, or LC8) • Left Front Side of the Engine Components (2 of 2, L20, L96, or LC8)	Q12 Evaporative Emission Purge Solenoid Valve (L20, L96, or LC8)
Q13	Evaporative Emission Vent Solenoid Valve	L20 or L96	Attached to the side of the EVAP canister, front of the fuel tank	—	Q13 Evaporative Emission Vent Solenoid Valve (L20, L96, or LC8)
Q13	Evaporative Emission Vent Solenoid Valve	LC8	In the vehicle underbody, left side middle	—	Q13 Evaporative Emission Vent Solenoid Valve (L20, L96, or LC8)
Q14	Exhaust Gas Recirculation Valve	LGH	In the engine compartment, on the top right of the engine	Left Front of the Engine Components (LGH)	Q14 Exhaust Gas Recirculation Valve (LGH)
Q17A	Fuel Injector 1	L20, L96, or LC8	On the left side of the intake manifold, at the #1 cylinder intake port	• Upper Left Side of the Engine Components (L20, L96, or LC8) • Right front of the Engine Components (LGH)	• Q17A Fuel Injector 1 (L20, L96 or LC8 with FHZ) • Q17A Fuel Injector 1 (LC8 with KO7 and UFM)
Q17A	Fuel Injector 1	LGH	Near the right side engine rocker cover above the #1 cylinder	• Upper Left Side of the Engine Components (L20, L96, or LC8) • Right front of the Engine Components (LGH)	Q17A Fuel Injector 1 (LGH)
Q17B	Fuel Injector 2	L20, L96, or LC8	On the right side of the intake manifold, at the #2 cylinder intake port	• Left Front of the Engine Components (LGH) • Upper Right Side of the Engine Components (L20, L96, or LC8)	• Q17B Fuel Injector 2 (L20, L96 or LC8 with FHZ) • Q17B Fuel Injector 2 (LC8 with KO7 and UFM)

Q17B	Fuel Injector 2	LGH	Near the left side engine rocker cover above the #2 cylinder	• *Left Front of the Engine Components (LGH)* • *Upper Right Side of the Engine Components (L20, L96, or LC8)*	*Q17B Fuel Injector 2 (LGH)*
Q17C	Fuel Injector 3	L20, L96, or LC8	On the left side of the intake manifold, at the #3 cylinder intake port	• *Right front of the Engine Components (LGH)* • *Upper Left Side of the Engine Components (L20, L96, or LC8)*	• *Q17C Fuel Injector 3 (L20, L96 or LC8 with FHZ)* • *Q17C Fuel Injector 3 (LC8 with KO7 and UFM)*
Q17C	Fuel Injector 3	LGH	Near the right side engine rocker cover above the #3 cylinder	• *Right front of the Engine Components (LGH)* • *Upper Left Side of the Engine Components (L20, L96, or LC8)*	*Q17C Fuel Injector 3 (LGH)*
Q17D	Fuel Injector 4	L20, L96, or LC8	On the right side of the intake manifold, at the #4 cylinder intake port	• *Left Front of the Engine Components (LGH)* • *Upper Right Side of the Engine Components (L20, L96, or LC8)*	• *Q17D Fuel Injector 4 (L20, L96 or LC8 with FHZ)* • *Q17D Fuel Injector 4 (LC8 with KO7 and UFM)*
Q17D	Fuel Injector 4	LGH	Near the left side engine rocker cover above the #4 cylinder	• *Left Front of the Engine Components (LGH)* • *Upper Right Side of the Engine Components (L20, L96, or LC8)*	*Q17D Fuel Injector 4 (LGH)*
Q17E	Fuel Injector 5	L20, L96, or LC8	On the left side of the intake manifold, at the #5 cylinder intake port	• *Right front of the Engine Components (LGH)* • *Upper Left Side of the Engine Components (L20, L96, or LC8)*	• *Q17E Fuel Injector 5 (L20, L96 or LC8 with FHZ)* • *Q17E Fuel Injector 5 (LC8 with KO7 and UFM)*
Q17E	Fuel Injector 5	LGH	Near the right side engine rocker cover above the #5 cylinder	• *Right front of the Engine Components (LGH)* • *Upper Left Side of the Engine Components (L20, L96, or LC8)*	*Q17E Fuel Injector 5 (LGH)*
Q17F	Fuel Injector 6	L20, L96, or LC8	On the right side of the intake manifold, at the #6 cylinder intake port	• *Left Front of the Engine Components (LGH)* • *Upper Right Side of the Engine Components (L20, L96, or LC8)*	• *Q17F Fuel Injector 6 (L20, L96 or LC8 with FHZ)* • *Q17F Fuel Injector 6 (LC8 with KO7 and UFM)*
Q17F	Fuel Injector 6	LGH	Near the left side engine rocker cover above the #6 cylinder	• *Left Front of the Engine Components (LGH)* • *Upper Right Side of the Engine Components (L20, L96, or LC8)*	*Q17F Fuel Injector 6 (LGH)*
Q17G	Fuel Injector 7	L20, L96, or LC8	On the left side of the intake manifold, at the #7 cylinder intake port	• *Right front of the Engine Components (LGH)* • *Upper Left Side of the Engine Components (L20, L96, or LC8)*	• *Q17G Fuel Injector 7 (L20, L96 or LC8 with FHZ)* • *Q17G Fuel Injector 7 (LC8 with KO7 and UFM)*
Q17G	Fuel Injector 7	LGH	Near the right side engine rocker cover above the #7 cylinder	• *Right front of the Engine Components (LGH)* • *Upper Left Side of the Engine Components (L20, L96, or LC8)*	*Q17G Fuel Injector 7 (LGH)*

Q17H	Fuel Injector 8	L20, L96, or LC8	On the right side of the intake manifold, at the #8 cylinder intake port	• *Upper Right Side of the Engine Components (L20, L96, or LC8)* • *Left Front of the Engine Components (LGH)*	• *Q17H Fuel Injector 8 (L20, L96 or LC8 with FHZ)* • *Q17H Fuel Injector 8 (LC8 with KO7 and UFM)*
Q17H	Fuel Injector 8	LGH	Near the left side engine rocker cover above the #8 cylinder	• *Upper Right Side of the Engine Components (L20, L96, or LC8)* • *Left Front of the Engine Components (LGH)*	*Q17H Fuel Injector 8 (LGH)*
Q18A	Fuel Pressure Regulator 1	LGH	In the engine compartment, mounted on top of the fuel injection pump	*Top of the Engine Compoents (2 of 3, LGH)*	*Q18A Fuel Pressure Regulator 1 (LGH)*
Q18B	Fuel Pressure Regulator 2	LGH	In the engine compartment, mounted to the front of the left fuel rail	*Top of the Engine Compoents (2 of 3, LGH)*	*Q18B Fuel Pressure Regulator 2 (LGH)*
Q20	Intake Air Flow Valve	LGH	At the top front of the engine, adjacent to E24 Intake Air Heater	• *Left Front of the Engine Components (LGH)* • *Top of the Engine Components (1 of 3, LGH)*	*Q20 Intake Air Flow Valve (LGH)*
Q27A	Pressure Control Solenoid Valve 1	—	Internal to T12 Automatic Transmission Assembly	—	—
Q27B	Pressure Control Solenoid Valve 2	—	Internal to T12 Automatic Transmission Assembly	—	—
Q27C	Pressure Control Solenoid Valve 3	—	Internal to T12 Automatic Transmission Assembly	—	—
Q27D	Pressure Control Solenoid Valve 4	—	Internal to T12 Automatic Transmission Assembly	—	—
Q27E	Pressure Control Solenoid Valve 5	—	Internal to T12 Automatic Transmission Assembly	—	—
Q38	Throttle Body	L20, L96, or LC8	Attached to the center front of the intake manifold	• *Left Front Side of the Engine Components (2 of 2, L20, L96, or LC8)* • *Top of the Engine Components (1 of 3, LGH)* • *Top of the Engine Components (L20, L96, or LC8)* • *Right Front Side of the Engine Components (1 of 2, L20, L96, or LC8)*	*Q38 Throttle Body (L20, L96, or LC8)*
Q39A	Torque Converter Clutch Pressure Control Solenoid Valve	—	Internal to T12 Automatic Transmission Assembly	—	—
Q41	Turbocharger Vane Position Control Solenoid Valve	LGH	In the engine compartment, mounted on the right side of the turbocharger, between the front and rear turbocharger housings	• *Right front of the Engine Components (LGH)* • *Top of the Engine Components (1 of 3, LGH)*	*Q41 Turbocharger Vane Position Control Solenoid Valve (LGH)*
Q53	Fuel Cut-Off Solenoid Valve	KO7 with UFM	Under the vehicle, attached to fuel tank	—	*Q53 Fuel Cut-Off Solenoid Valve (KO7 with UFM)*
Q58F	LPG Cut-Off Solenoid Valve - Front	KO7 with UFP	Underneath vehicle, attached to front of primary fuel tank, internal to the LPG Pump Assembly — Primary	—	—

Q58R	LPG Cut-Off Solenoid Valve - Rear	KO7	Underneath vehicle, attached to front of primary fuel tank, internal to the LPG Pump Assembly — Secondary	—	—
Q61	Reductant Injector	LGH	Under the vehicle, attached to the exhaust pipe, near the rear of the catalytic converter	*Exhaust Components (LGH)*	*Q61 Reductant Injector (Cargo/Passenger)*
Q62	Reductant Purge Solenoid Valve	LGH	Under the vehicle, above the reductant tank	*Reductant Tank Components*	*Q62 Reductant Purge Solenoid Valve (LGH)*
Q67	Exhaust Aftertreatment Fuel Injector	LGH	In the engine compartment, on the right rear side of the engine	*Right front of the Engine Components (LGH)*	*Q67 Exhaust After treatment Fuel Injector (LGH)*
Q68A	CNG Cut-Off Solenoid Valve 1	FHZ	In the vehicle underbody, on front of CNG tank, inboard side of left frame rail, near EBCM	—	*Q68A CNG Cut-Off Solenoid Valve 1 (FHZ)*
Q68B	CNG Cut-Off Solenoid Valve 2	FHZ	In the vehicle underbody, on left side of CNG tank, rear of axle between frame rails, forward tank	—	*Q68B CNG Cut-Off Solenoid Valve 2 (FHZ)*
Q68C	CNG Cut-Off Solenoid Valve 3	FHZ	In the vehicle underbody, on left side of CNG tank, rear of axle between frame rails, rearmost tank	—	*Q68C CNG Cut-Off Solenoid Valve 3 (FHZ)*
Q68D	CNG Cut-Off Solenoid Valve 4	FHZ with UFP	In the left rear of the cargo compartment, on rear of CNG tank	—	*Q68D CNG Cut-Off Solenoid Valve 4 (FHZ)*
Q68D	CNG Cut-Off Solenoid Valve 4	FHZ without UFP	In the vehicle underbody, near CNG tank, rear of axle between frame rails	—	*Q68D CNG Cut-Off Solenoid Valve 4 (FHZ)*
Q69	CNG High Pressure Regulator Solenoid Valve	FHZ	In the vehicle underbody, left side, rear of b-pillar, inboard of left frame rail, forward of CNG control module, near EBCM	—	*Q69 CNG High Pressure Regulator Solenoid Valve (FHZ)*
Q71	LPG Purge Solenoid Valve	KO7 with UFP	Underneath vehicle, attached to front of primary fuel tank, internal to the LPG Pump Assembly — Primary	—	—
Q72	LPG Bypass Solenoid Valve	KO7 with UFM	Underneath the vehicle, attached to fuel tank	—	*Q72 LPG Bypass Solenoid Valve (KO7 with UFM)*
R3	Blower Motor Resistor	—	Right rear of the engine compartment, attached to the evaporator case	*Engine Compartment Components (1 of 2)*	• *R3 Blower Motor Resistor (L20, L96, or LC8)* • *R3 Blower Motor Resistor (LGH)*
R3B	Blower Motor Resistor - Auxiliary	C69	In the left rear of the passenger compartment, attached to the auxiliary HVAC module	*Left Rear Cargo Area Components (Passenger or Cargo)*	*R3B Blower Motor Resistor - Auxiliary (C69)*
S2	Transmission Manual Shift Switch	—	Mounted on the shift lever, extending from the right side of the steering column	—	—
S13A	Door Lock Switch - Rear Cargo	Passenger or Cargo with AU3	Attached to the right cargo door accessory mount plate	*Rear Door Components (Passenger or Cargo)*	*S13A Door Lock Switch - Rear Cargo (Passenger or Cargo with AU3)*
S13D	Door Lock Switch - Driver	AU3	Attached to the left front door accessory mount plate	*Driver Door Components*	*S13D Door Lock Switch - Driver (AU3)*
S13P	Door Lock Switch - Passenger	AU3	Attached to the right front door accessory mount plate	*Front Passenger Door Components*	*S13P Door Lock Switch - Passenger (AU3)*
S16	Driver Information Center Switch	—	On the dash, just to the left of P16 Instrument Cluster	*Instrument Panel Components (1 of 2)*	*S16 Driver Information Center Switch*
S26	Hazard Lamps Switch	—	On top of the steering column	*Steering Column Components (1 of 2)*	—

S30	Headlamp Switch	—	At the left side of the instrument panel	*Instrument Panel Components (1 of 2)*	*S30 Headlamp Switch*
S33	Horn Switch	—	Inside the upper steering column, behind the inflatable restraint steering wheel module	*Steering Column Components (1 of 2)*	• *S33 Horn Switch X1* • *S33 Horn Switch X2*
S34	HVAC Controls Switch Assembly	—	In the center of the instrument panel	*Instrument Panel Components (1 of 2)*	• *S34 HVAC Controls Switch Assembly X1* • *S34 HVAC Controls Switch Assembly X2* • *S34 HVAC Controls Switch Assembly X3* • *S34 HVAC Controls Switch Assembly X4 (C60)*
S34F	HVAC Controls Switch Assembly - Auxiliary Front	C36 or C69	On the front of the overhead console	*Headliner Components*	• *S34F HVAC Controls Switch Assembly - Auxiliary Front (C69 with Rear HVAC Controls)* • *S34F HVAC Controls Switch Assembly - Auxiliary Front (C69 without Rear HVAC Controls)*
S34R	HVAC Controls Switch Assembly - Auxiliary Rear	C36 or C69 with Rear HVAC Controls	In the headliner, near the center of the vehicle	*Headliner Components*	*S34R HVAC Controls Switch Assembly - Auxiliary Rear (C69 with Rear HVAC Controls)*
S36	Instrument Panel Dimmer Switch	—	On the far left side of the dash, adjacent to the headlight switch	—	—
S39	Ignition Switch	—	On the right side of the steering column	*Steering Column Components (1 of 2)*	*S39 Ignition Switch*
S40	Passenger Air Bag Disable Switch	C99	In the center of the instrument panel	*Instrument Panel Components (1 of 2)*	*S40 Passenger Air Bag Disable Switch (C99)*
S51	Telematics Button Assembly	UE1	In the center of the instrument panel, just below the radio	—	*S51 Telematics Button Assembly (UE1)*
S52	Outside Rearview Mirror Switch	DEB or DE5	Attached to the left front door accessory mount plate	*Driver Door Components*	*S52 Outside Rearview Mirror Switch (DEB or DE5)*
S64D	Seat Adjuster Switch - Driver	AG1	Attached to the front panel of the driver seat	*Driver Seat Components*	*S64D Seat Adjuster Switch - Driver (AG1)*
S64P	Seat Adjuster Switch - Passenger	AG2	Attached to the front panel of the front passenger seat	*Passenger Seat Components*	*S64P Seat Adjuster Switch - Passenger (AG2)*
S70L	Steering Wheel Controls Switch - Left	K34	On the left steering wheel spoke	*Instrument Panel Components (1 of 2)*	*S70L Steering Wheel Controls Switch - Left (K34)*
S70R	Steering Wheel Controls Switch - Right	W1Y	On the right steering wheel spoke	*Instrument Panel Components (1 of 2)*	*S70R Steering Wheel Controls Switch - Right (W1Y)*
S74	Tow/Haul Mode Switch	—	In the center of the instrument panel	*Instrument Panel Components (1 of 2)*	*S74 Tow/Haul Mode Switch*
S75	Traction Control Switch	JL4	In the center of the instrument panel	*Instrument Panel Components (1 of 2)*	*S75 Traction Control Switch (JL4)*

S78	Turn Signal/Multi-Function Switch	—	On the left side of the steering column	• *Instrument Panel Components (1 of 2)* • *Steering Column Components (1 of 2)*	• *S78 Turn Signal/Multifunction Switch X1* • *S78 Turn Signal/Multifunction Switch X2* • *S78 Turn Signal/Multifunction Switch X3*
S79D	Window Switch - Driver	A31	Attached to the left front door accessory mount plate	*Driver Door Components*	*S79D Window Switch - Driver (A31)*
S79P	Window Switch - Passenger	A31	Attached to the right front door accessory mount plate	*Front Passenger Door Components*	*S79P Window Switch - Passenger (A31)*
S85	Auxiliary Blower Motor Switch	C36 or C69	In the center of the instrument panel	*Instrument Panel Components (1 of 2)*	*S85 Auxiliary Blower Motor Switch (C36 or C69)*
T1	Accessory DC/AC Power Inverter Module	KI4	Attached to the Instrument Panel Harness	—	—
T4G	Cellular Phone, Navigation, and Digital Radio Antenna	U2K, UBS, UI8, or UE1	Mounted towards the left front of the roof	—	• *T4G Cellular Phone, Navigation, and Digital Radio Antenna X1 (U2K or UBS)* • *T4G Cellular Phone, Navigation, and Digital Radio Antenna X2 (UI8 or UE1)*
T4M	Radio Antenna	U73	Mounted on top of the right front fender, adjacent to the hood	*Right Rear of the Engine Compartment Components*	*T4M Radio Antenna*
T4S	Wireless Communication Antenna - Bluetooth	UE1	Internal to K73 Telematics Communication Interface Control Module	—	—
T8A	Ignition Coil 1	L20, L96, or LC8	On the left rocker cover center at cylinder 1	*Upper Left Side of the Engine Components (L20, L96, or LC8)*	*T8A Ignition Coil 1 (L20, L96, or LC8)*
T8B	Ignition Coil 2	L20, L96, or LC8	On the right rocker cover center at cylinder 2	• *Upper Right Side of the Engine Components (L20, L96, or LC8)* • *Right Front Side of the Engine Components (1 of 2, L20, L96, or LC8)*	*T8B Ignition Coil 2 (L20, L96, or LC8)*
T8C	Ignition Coil 3	L20, L96, or LC8	On the left rocker cover center at cylinder 3	*Upper Left Side of the Engine Components (L20, L96, or LC8)*	*T8C Ignition Coil 3 (L20, L96, or LC8)*
T8D	Ignition Coil 4	L20, L96, or LC8	On the right rocker cover center at cylinder 4	• *Right Front Side of the Engine Components (1 of 2, L20, L96, or LC8)* • *Upper Right Side of the Engine Components (L20, L96, or LC8)*	*T8D Ignition Coil 4 (L20, L96, or LC8)*
T8E	Ignition Coil 5	L20, L96, or LC8	On the left rocker cover center at cylinder 5	*Upper Left Side of the Engine Components (L20, L96, or LC8)*	*T8E Ignition Coil 5 (L20, L96, or LC8)*
T8F	Ignition Coil 6	L20, L96, or LC8	On the right rocker cover center at cylinder 6	• *Right Front Side of the Engine Components (1 of 2, L20, L96, or LC8)* • *Upper Right Side of the Engine Components (L20, L96, or LC8)*	*T8F Ignition Coil 6 (LC8, LMF, L20 or L96)*
T8G	Ignition Coil 7	L20, L96, or LC8	On the left rocker cover rear at cylinder 7	*Upper Left Side of the Engine Components (L20, L96, or LC8)*	*T8G Ignition Coil 7 (L20, L96, or LC8)*

T8H	Ignition Coil 8	L20, L96, or LC8	On the right rocker cover rear at cylinder 8	• Right Front Side of the Engine Components (1 of 2, L20, L96, or LC8) • Upper Right Side of the Engine Components (L20, L96, or LC8)	T8H Ignition Coil 8 (L20, L96, or LC8)
T12	Automatic Transmission Assembly	—	Under the vehicle attached to the rear of the engine	—	—
T15	Navigation Antenna Signal Splitter	UI8 with UE1	Behind the dash on the left side, adjacent to K73 Telematics Communication Interface Control Module	—	—
X50A	Fuse Block - Underhood	—	In the engine compartment, attached to the left front fender	• Engine Compartment Components (2 of 2, LGH) • Engine Compartment Components (1 of 2)	• X50A Fuse Block - Underhood X1 • X50A Fuse Block - Underhood X2 • X50A Fuse Block - Underhood X3 • X50A Fuse Block - Underhood X4 • X50A Fuse Block - Underhood X5 • X50A Fuse Block - Underhood X6
X52A	Fuse Block - Passenger Compartment	—	Below the driver seat	Left Front of Passenger Compartment Components	• X52A Fuse Block - Passenger Compartment X1 • X52A Fuse Block - Passenger Compartment X2 • X52A Fuse Block - Passenger Compartment X3
X53A	Fuse Block - Rear Body	PRP	Within the cargo area	—	—
X55VA	Fuse Holder 1 - Alternative Fuel	KO7 with UFM	Attached to the LPG Harness	—	—
X55VB	Fuse Holder 2 - Alternative Fuel	KO7 with UFP	Attached to the LPG Harness	—	—
X55AN	Fuse Holder 1 - CNG	FHZ	Fuse holder added into the top of X50A at F65UA	—	—
X55AP	Fuse Holder 2 - CNG	FHZ	Fuse holder added into the top of X50A at F24UA	—	—
X60A	Junction Block - Underhood	LGH or TP2	In the engine compartment, in-between M64 Starter Motor and X50A Fuse Block - Underhood	—	—
X80A	Accessory Power Receptacle - Center Console 1	Without DT4	In the center of the instrument panel	Instrument Panel Components (1 of 2)	—
X80B	Accessory Power Receptacle - Center Console 2	—	In the right center of the instrument panel	Instrument Panel Components (1 of 2)	X80B Accessory Power Receptacle - Center Console 2
X81	Accessory Power Receptacle - 110V AC	KI4	Within the passenger compartment	—	—
X84	Data Link Connector	—	Left lower side of the instrument panel, near the park brake pedal assembly	Instrument Panel Components (1 of 2)	X84 Data Link Connector
X85	Steering Wheel Air Bag Coil	—	Inside the upper steering column	—	• X85 Steering Wheel Air Bag Coil X1 • X85 Steering Wheel Air Bag Coil X2

X87RB	Sliding Door Jamb Contact Plate - Right Body	AU3 and E24 or YA2	Attached to the right B-pillar	• *Right Sliding Door Components (YA2)* • *Right Side Hinged Door Components (E24)*	*X87RB Sliding Door Jamb Contact Plate - Right Body (AU3 with E24 or YA2)*
X88	Trailer Connector	UY7	Below the rear bumper, near the center	—	• *X88 Trailer Connector (UY7 with NE7)* • *X88 Trailer Connector (UY7 without NE7)*
X92	USB Receptacle	USR	Slightly below and to the right of A11 Radio	—	—
X100	Instrument Panel Harness to Engine Harness	L20, L96, or LC8	Left rear of the engine compartment near the underhood fuse block and the horn	• *Instrument Panel Harness Routing - Engine Compartment* • *Engine Harness Routing - Front (L20, L96, or LC8)* • *Engine Harness Routing - Left Side of Engine Compartment (LGH)*	• *X100 Instrument Panel Harness to Engine Chassis Harness (LGH)* • *X100 Instrument Panel Harness to Engine Harness (L20, L96, or LC8)*
X100	Instrument Panel Harness to Engine Chassis Harness	LGH	Left rear of the engine compartment near the underhood fuse block and the horn	• *Instrument Panel Harness Routing - Engine Compartment* • *Engine Harness Routing - Front (L20, L96, or LC8)* • *Engine Harness Routing - Left Side of Engine Compartment (LGH)*	• *X100 Instrument Panel Harness to Engine Chassis Harness (LGH)* • *X100 Instrument Panel Harness to Engine Harness (L20, L96, or LC8)*
X101	Chassis Harness to Engine Harness	L20, L96, or LC8	Left rear of the engine compartment behind the underhood fuse block	• *Chassis Harness Routing (LGH)* • *Engine Harness Routing - Left Side of Engine Compartment (LGH)* • *Engine Harness Routing - Front (L20, L96, or LC8)* • *Chassis Harness Routing (L20, L96, or LC8)*	• *X101 Chassis Harness to Engine Harness (L20, L96, or LC8)* • *X101 Engine Chassis Harness to Chassis Harness (LGH)*
X101	Engine Chassis Harness to Chassis Harness	LGH	Left rear of the engine compartment behind the underhood fuse block	• *Chassis Harness Routing (LGH)* • *Engine Harness Routing - Left Side of Engine Compartment (LGH)* • *Engine Harness Routing - Front (L20, L96, or LC8)* • *Chassis Harness Routing (L20, L96, or LC8)*	• *X101 Chassis Harness to Engine Harness (L20, L96, or LC8)* • *X101 Engine Chassis Harness to Chassis Harness (LGH)*
X103	Instrument Panel Harness to Engine Harness	—	Instrument panel harness to engine harness, about 8.8 inches (225 mm) from I/P underhood break out after pass through grommet	—	—
X104	Instrument Panel Harness to Front Impact Sensor Jumper	—	Instrument panel harness to the inflatable restraint front end sensor jumper harness, bottom left side of the radiator support	*Instrument Panel Harness Routing - Engine Compartment*	*X104 Instrument Panel Harness to Front Impact Sensor Jumper*
X105	Engine Harness to Chassis Harness	LGH	Engine chassis harness to the chassis harness, right front inner frame rail	—	*X105 Engine Harness to Chassis Harness (LGH)*
X107	Engine Chassis Harness to Engine Harness	LGH	Engine chassis harness to the engine harness, in the engine compartment, left front upper corner of the engine assembly	*Engine Harness Routing - Left Side of Engine Compartment (LGH)*	*X107 Engine Chassis Harness to Engine Harness (LGH)*

X109	Engine Harness to Underhood Lamp Harness	L20, L96, or LC8	Engine harness to the underhood lamp jumper harness, left rear of the engine compartment	● *Engine Harness Routing - Front (L20, L96, or LC8)* ● *Engine Harness Routing - Left Side of Engine Compartment (LGH)*	● *X109 Engine Chassis Harness to Underhood Lamp Harness (LGH)* ● *X109 Engine Harness to Underhood Lamp Harness (L20, L96, or LC8)*
X109	Engine Chassis Harness to Underhood Lamp Harness	LGH	Engine harness to the underhood lamp jumper harness, left rear of the engine compartment	● *Engine Harness Routing - Front (L20, L96, or LC8)* ● *Engine Harness Routing - Left Side of Engine Compartment (LGH)*	● *X109 Engine Chassis Harness to Underhood Lamp Harness (LGH)* ● *X109 Engine Harness to Underhood Lamp Harness (L20, L96, or LC8)*
X110	Engine Jumper Harness to Engine Harness	LGH	Engine jumper harness to the engine harness, in the engine compartment, near the upper front corner of the left valve cover	● *Engine Harness Routing - Left Front of Engine (LGH)* ● *Top of the Engine Components (1 of 3, LGH)*	*X110 Engine Jumper Harness to Engine Harness (LGH)*
X112	Fuel Rail Jumper Harness to Engine Harness	LGH	Fuel rail jumper harness to the engine harness, in the engine compartment, near the upper rear corner of the left valve cover	● *Engine Harness Routing - Left Front of Engine (LGH)* ● *Top of the Engine Components (3 of 3, LGH)* ● *Top of the Engine Components (1 of 3, LGH)*	*X112 Fuel Rail Jumper Harness to Engine Harness (LGH)*
X115	Engine Chassis Harness to Catalytic Converter Jumper Harness	Cutaway with LGH	Engine chassis harness to the catalytic converter jumper harness, in the lower right rear side of the engine compartment	—	*X115 Engine Chassis Harness to Catalytic Converter Jumper Harness (Cutaway with LGH)*
X126	Engine Harness to Left Ignition Coil Harness	L20, L96, or LC8	Engine harness to the left ignition coils jumper harness, top center of the left valve cover	● *Engine Harness Routing - Left Rear of Engine (L20, L96, or LC8)* ● *Engine Harness Routing - Front (L20, L96, or LC8)* ● *Upper Left Side of the Engine Components (L20, L96, or LC8)*	*X126 Engine Harness to Left Ignition Coil Harness (L20, L96, or LC8)*
X127	Engine Harness to Right Ignition Coil Harness	L20, L96, or LC8	Engine harness to the right ignition coils jumper harness, top center of the right valve cover	*Upper Right Side of the Engine Components (L20, L96, or LC8)*	*X127 Engine Harness to Right Ignition Coil Harness (L20, L96, or LC8)*
X128	Engine Harness to Heated Oxygen Sensor Jumper Harness	L20, L96 or LC8	Engine harness to the rear oxygen sensors jumper harness, right frame rail	● *Exhaust Components (L20, L96, or LC8)* ● *Engine Harness Routing - Front (L20, L96, or LC8)*	*X128 Engine Harness to Heated Oxygen Sensor Jumper Harness (L20, L96, or LC8)*
X141	Instrument Panel Harness to Brake Fluid Level Jumper Harness	UJ1	Instrument panel harness to the brake fluid alarm switch jumper harness, left rear of the engine compartment near the cowl	● *Instrument Panel Harness Routing - Engine Compartment* ● *Brake Booster Fluid Alarm Switches (UJ1)*	*X141 Instrument Panel Harness to Brake Fluid Level Jumper Harness (UJ1)*
X142	Engine Chassis Harness to Fan Jumper Harness	LGH	Engine chassis harness to the fan jumper harness, near the front of the engine	*Front of Engine Compartment Components (2 of 2, LGH)*	*X142 Engine Chassis Harness to Fan Jumper Harness (LGH)*
X150	Instrument Panel Harness to Forward Lamp Harness	—	Instrument panel harness to the forward lamp harness, near the upper radiator hose at the radiator entry point	● *Forward Lamp Harness Routing* ● *Instrument Panel Harness Routing - Engine Compartment*	*X150 Instrument Panel Harness to Forward Lamp Harness*
X161	Engine Harness to Fuel Injector 1 Harness	KO7 with UFM	On the left side of the intake manifold, above fuel injector 1	—	*X161 Engine Harness to Fuel Injector 1 Harness (KO7 and UFM)*

X162	Engine Harness to Fuel Injector 2 Harness	KO7 with UFM	On the right side of the intake manifold, above fuel injector 2	—	*X162 Engine Harness to Fuel Injector 2 Harness (KO7 and UFM)*
X163	Engine Harness to Fuel Injector 3 Harness	KO7 with UFM	On the left side of the intake manifold, above fuel injector 3	—	*X163 Engine Harness to Fuel Injector 3 Harness (KO7 and UFM)*
X164	Engine Harness to Fuel Injector 4 Harness	KO7 with UFM	On the right side of the intake manifold, above fuel injector 4	—	*X164 Engine Harness to Fuel Injector 4 Harness (KO7 and UFM)*
X165	Engine Harness to Fuel Injector 5 Harness	KO7 with UFM	On the left side of the intake manifold, above fuel injector 5	—	*X165 Engine Harness to Fuel Injector 5 Harness (KO7 and UFM)*
X166	Engine Harness to Fuel Injector 6 Harness	KO7 with UFM	On the right side of the intake manifold, above fuel injector 6	—	*X166 Engine Harness to Fuel Injector 6 Harness (KO7 and UFM)*
X167	Engine Harness to Fuel Injector 7 Harness	KO7 with UFM	On the left side of the intake manifold, above fuel injector 7	—	*X167 Engine Harness to Fuel Injector 7 Harness (KO7 and UFM)*
X168	Engine Harness to Fuel Injector 8 Harness	KO7 with UFM	On the right side of the intake manifold, above fuel injector 8	—	*X168 Engine Harness to Fuel Injector 8 Harness (KO7 and UFM)*
X174	Transmission Harness to Chassis Harness	LGH	Chassis harness to the transmission jumper harness, left center upper frame rail near the fuel pump assembly	—	*X174 Transmission Harness to Chassis Harness (LGH)*
X177	Engine Harness to Camshaft Position Sensor Jumper Harness	L20, L96, or LC8	Engine harness to the camshaft harness, left front of the engine near the crank pulley	*Engine Harness Routing - Front (L20, L96, or LC8)*	• *X177 Engine Harness to Camshaft Position Sensor Jumper Harness (L20)* • *X177 Engine Harness to Camshaft Position Sensor Jumper Harness (L96 or LC8)*
X180	LPG Tank Harness to LPG Main Harness	KO7 with UFM	LPG tank harness to LPG main harness, about 254 mm (10.07 inches) from X350	—	*X180 LPG Tank Harness to LPG Main Harness (KO7 with UFM)*
X199	CNG Jumper Harness to CNG Harness	FHZ	In the engine compartment, at the left side, zip tied to the Engine Harness	—	—
X200	Steering Column Harness to Instrument Panel Harness	—	Steering column harness to the instrument panel harness, at the base of the steering column	• *Steering Column Harness Routing* • *Instrument Panel Harness Routing - Dash Area (1 of 2)*	*X200 Steering Column Harness to Instrument Panel Harness*
X202	Instrument Panel Harness to Engine Harness	UD7	Instrument panel harness to engine harness, about 8.8 inches (225 mm) from I/P underhood break out after pass through grommet	—	*X202 Instrument Panel Harness to Engine Harness (UD7)*
X204	Body Harness to Headliner Harness	UVC	Body harness to headliner harness,	*Body Harness Routing - Right Front of Passenger Compartment*	*X204 Body Harness to Headliner Harness (UVC)*
X205	Front Headliner Harness to Body Harness	—	Front headliner harness to the body harness, behind the A-pillar	• *Body Harness Routing - Right Front of Passenger Compartment* • *Body Harness Routing - Roof Area*	*X205 Front Headliner Harness to Body Harness*
X220	Instrument Panel Harness to Park Brake Jumper Harness	—	Instrument panel harness to the parking brake jumper harness, left side of the instrument panel, center of the parking brake pedal assembly	*Instrument Panel Harness Routing - Dash Area (1 of 2)*	*X220 Instrument Panel Harness to Park Brake Jumper Harness*
X222	Upfitter Provision Harness to Instrument Panel Harness	YF2 or YF7	Upfitter harness to the instrument panel harness, left side of the instrument panel near the parking brake lever assembly	• *Body Harness Routing - Left Rear (Passenger or Cargo)* • *Instrument Panel Harness Routing - Dash Area (1 of 2)*	*X222 Upfitter Provision Harness to Instrument Panel Harness (YF2 or YF7)*

X225	Accelerator Pedal Position (APP) Sensor Jumper Harness to Instrument Panel Harness	—	Accelerator Pedal Position (APP) Jumper Harness to Instrument Panel Harness, located between Accelerator Pedal Position (APP) sensor and Instrument Panel Harness	—	*X225 Accelerator Pedal Position (APP) Sensor Jumper Harness to Instrument Panel Harness*
X276	Steering Wheel Harness to Instrument Panel Harness	—	Steering wheel harness to the instrument panel harness, in the back of the left instrument panel knee bolster above X200	*Instrument Panel Harness Routing - Dash Area (1 of 2)*	*X276 Steering Wheel Harness to Instrument Panel Harness*
X289	Side Access Panel Harness to Instrument Panel Harness	PRP	Inside the vehicle, towards the left front	—	*X289 Side Access Panel Harness to Instrument Panel Harness (PRP)*
X290	Instrument Panel Harness to Side Access Panel Harness	PRP	Inside the vehicle, towards the left front	—	*X290 Instrument Panel Harness to Side Access Panel Harness (PRP)*
X299	Instrument Panel Harness to CNG Jumper Harness	FHZ	Inside the vehicle, above the driver footwell, extension of the Data Link Connector	—	—
X305	Chassis Harness to Fuel Pump Jumper Harness	K08	Chassis harness to the coolant heater fuel pump jumper harness, left center inner frame rail near the fuel pump assembly	*Chassis Harness Routing (LGH)*	*X305 Chassis Harness to Fuel Pump Jumper Harness (K08)*
X306	Body Harness to Passenger Seat Harness	—	Body harness to the front passenger seat harness, right side of the passenger compartment below the passenger seat	• *Driver Seat Harness Routing and Front Passenger Seat Harness Routing* • *Passenger Seat Components* • *Body Harness Routing - Right Front of Passenger Compartment*	*X306 Body Harness to Passenger Seat Harness*
X307	Body Harness to Driver Seat Harness	—	Body harness to the driver seat harness, left side of the passenger compartment below the driver seat	• *Driver Seat Harness Routing and Front Passenger Seat Harness Routing* • *Driver Seat Components*	*X307 Body Harness to Driver Seat Harness*
X316	Transmission Harness to Fuel Pump Harness	LGH	Transmission jumper harness to the fuel pump harness,	—	*X316 Transmission Harness to Fuel Pump Harness (LGH)*
X318	Instrument Panel Harness to Body Harness	—	Instrument panel harness to the body harness, behind the left kick panel	• *Instrument Panel Harness Routing - Dash Area (1 of 2)* • *Body Harness Routing - Left Front of Passenger Compartment*	*X318 Instrument Panel Harness to Body Harness*
X319	Rear Heater Switch Harness to Body Harness	ENC, C69, or C36	Rear heater switch harness to the body harness, behind the left kick panel	*Body Harness Routing - Left Front of Passenger Compartment*	*X319 Rear Heater Switch Harness to Body Harness (ENC, C69, or C36)*
X320	Upfitter Provision Harness to Body Harness	YF2 or YF7	Upfitter harness to the body harness, left side of the passenger compartment lower left C-pillar	• *Body Harness Routing - Right Rear (Passenger or Cargo)* • *Body Harness Routing - Left Rear (Passenger or Cargo)*	*X320 Upfitter Provision Harness to Body Harness (YF2 or YF7)*
X321	Upfitter Provision Harness to Body Harness	YF2 or YF7	Upfitter harness to the body harness, left side of the passenger compartment center of the left C-pillar	—	*X321 Upfitter Provision Harness to Body Harness (YF2 or YF7)*
X323	Left Rear Side Impact Sensor Jumper to Body Harness	ASF	At the base of the left C-pillar	—	*X323 Left Rear Side Impact Sensor Jumper to Body Harness (ASF)*
X324	Right Rear Side Impact Sensor Jumper to Body Harness	ASF	At the base of the right C-pillar	*Body Harness Routing - Right C-Pillar*	*X324 Right Rear Side Impact Sensor Jumper to Body Harness (ASF)*
X329	Instrument Panel Harness to Body Harness	UVC	Instrument panel harness to the body harness, in the passenger compartment under the driver seat	*Body Harness Routing - Left Front of Passenger Compartment*	*X329 Instrument Panel Harness to Body Harness (UVC)*

X330	Instrument Panel Harness to Body Harness	—	Instrument panel harness to the body harness, under the driver seat	• *Instrument Panel Harness Routing - Dash Area (1 of 2)* • *Body Harness Routing - Left Front of Passenger Compartment*	*X330 Instrument Panel Harness to Body Harness*
X331	Instrument Panel Harness to Body Harness	—	Instrument panel harness to the body harness, under the driver seat	• *Instrument Panel Harness Routing - Dash Area (1 of 2)* • *Body Harness Routing - Left Front of Passenger Compartment*	*X331 Instrument Panel Harness to Body Harness*
X350	Chassis Harness to LPG Chassis Harness	KO7	Chassis harness to LPG chassis harness, in the vehicle underbody, left middle of frame rail	—	• *X350 Chassis Harness to CNG Power Harness (FHZ)* • *X350 Chassis Harness to LPG Chassis Harness (KO7 with UFM)* • *X350 Chassis Harness to LPG Harness (KO7 with UFP)*
X350	Chassis Harness to CNG Power Harness	FHZ	Chassis harness to CNG power harness, in the vehicle underbody, left middle	—	• *X350 Chassis Harness to CNG Power Harness (FHZ)* • *X350 Chassis Harness to LPG Chassis Harness (KO7 with UFM)* • *X350 Chassis Harness to LPG Harness (KO7 with UFP)*
X395	Chassis Harness to Reductant Jumper Harness	LGH	Chassis harness to reductant jumper harness, near left side of the frame, above the reductant tank	*Chassis Harness Routing (LGH)*	*X395 Chassis Harness to Reductant Jumper Harness (LGH)*
X400	Right Rear Cargo Door to Body Harness	Passenger or Cargo	Right cargo door harness to the body harness, right rear of the passenger compartment center of the right D-pillar	• *Body Harness Routing - Right Rear (Passenger or Cargo)* • *Rear Cargo Doors Harness Routing (Passenger or Cargo)*	*X400 Right Rear Cargo Door to Body Harness (Passenger or Cargo)*
X401	Left Tail Lamp Harness to Body Harness	Passenger or Cargo	Left tail lamp harness to the body harness, left rear of the passenger compartment center of the left D-pillar	*Body Harness Routing - Left Rear (Passenger or Cargo)*	*X401 Left Tail Lamp Harness to Body Harness (Passenger or Cargo)*
X402	Right Tail Lamp Harness to Body Harness	Passenger or Cargo	Right tail lamp harness to the body harness, RR of the passenger compartment center of the right D-pillar	*Body Harness Routing - Right Rear (Passenger or Cargo)*	*X402 Right Tail Lamp Harness to Body Harness (Passenger or Cargo)*
X403	Rear Cargo Door Harness to Body Harness	UVC	Rear cargo door harness to body harness,	• *Body Harness Routing - Left Front of Passenger Compartment* • *Body Harness Routing - Right Rear (Passenger or Cargo)*	*X403 Rear Cargo Door Harness to Body Harness (UVC)*
X405	Cutaway Rear Lighting Connector to Chassis Harness	Cutaway	Cutaway rear lighting connector to the chassis harness, left rear frame rail	• *Chassis Harness Routing (L20, L96, or LC8)* • *Chassis Harness Routing (LGH)*	*X405 Cutaway Rear Lighting Connector to Chassis Harness (Cutaway)*
X407	Rear HVAC Harness to Body Harness	C36 or C69	Rear HVAC harness to the body harness, left rear of the passenger compartment upper back side of the auxiliary HVAC module at the D-pillar	• *Body Harness Routing - Left Rear (Passenger or Cargo)* • *Body Harness Routing - Left Front of Passenger Compartment*	*X407 Rear HVAC Harness to Body Harness (C36 or C69)*

X408	Rear Bumper Harness to Chassis Harness	UD7	Rear bumper harness to chassis harness,	—	*X408 Rear Bumper Harness to Chassis Harness (UD7)*
X409	Rear HVAC Harness to Body Harness	C36 or C69	Rear HVAC harness to body harness, left rear of the passenger compartment upper back side of the auxiliary HVAC module	• *Body Harness Routing - Left Front of Passenger Compartment* • *Body Harness Routing - Left Rear (Passenger or Cargo)*	*X409 Rear HVAC Harness to Body Harness (C36 or C69)*
X411	Left Rear Cargo Door Harness to Body Harness	Passenger or Cargo	Left cargo door harness to the body harness, left rear of the passenger compartment center of the left D-pillar	• *Rear Cargo Doors Harness Routing (Passenger or Cargo)* • *Body Harness Routing - Left Rear (Passenger or Cargo)*	*X411 Left Rear Cargo Door Harness to Body Harness (Passenger or Cargo)*
X412	Right Rear Cargo Door Harness to Body Harness	Passenger or Cargo	Right cargo door harness to the body harness, right rear of the passenger compartment center of the right D-pillar	• *Rear Cargo Doors Harness Routing (Passenger or Cargo)* • *Body Harness Routing - Right Rear (Passenger or Cargo)*	*X412 Right Rear Cargo Door to Body Harness (Passenger or Cargo)*
X413	Chassis Harness to Left Rear Wheel Speed Sensor Jumper Harness	JL4	Chassis harness to the left rear wheel speed sensor jumper harness, left rear frame rail	—	*X413 Chassis Harness to Left Rear Wheel Speed Sensor Jumper Harness (JL4)*
X414	Chassis Harness to Right Rear Wheel Speed Sensor Jumper Harness	JL4	Chassis harness to the right rear wheel speed sensor jumper harness, right rear frame rail	—	*X414 Chassis Harness to Right Rear Wheel Speed Sensor Jumper Harness (JL4)*
X415	Roof Center Speaker Harness to Body Harness	Passenger or Cargo	Rear overhead speakers jumper harness to the body harness, rear of the passenger compartment center of the rear roof rail	—	*X415 Roof Center Speaker Harness to Body Harness (Passenger or Cargo)*
X417	Dome Lamp Harness to Body Harness	Cargo without YF7	Dome lamp to the body harness, left side of the passenger compartment near the upper left C-pillar	*Body Harness Routing - Roof Area*	*X417 Dome Lamp Harness to Body Harness (Cargo without YF7)*
X419	Center High Mounted Stop Lamp Harness to Body Harness	Passenger or Cargo	CHMSL harness to the body harness, rear of the passenger compartment center of the rear roof rail	*Body Harness Routing - Right Rear (Passenger or Cargo)*	*X419 Center High Mounted Stop Lamp Harness to Body Harness (Passenger or Cargo)*
X420	Headliner Harness to Body Harness	Passenger or Cargo	Headliner harness to the body harness, top of the right D-pillar	*Body Harness Routing - Roof Area*	*X420 Headliner Harness to Body Harness (Passenger or Cargo)*
X460	Chassis to Harness Trailer Provision	Cutaway with UY7 and NE7	Trailer Provision to Chassis Harness, in rear near Trailer Harness	—	*X460 Chassis Harness to Trailer Provision (Cutaway with UY7 and NE7)*
X500	Driver Door Harness to Body Harness	—	Driver door harness to the body harness, behind the left kick panel	*Body Harness Routing - Left Front of Passenger Compartment*	*X500 Driver Door Harness to Body Harness*
X501	Driver Side Impact Sensor Jumper Harness to Driver Door Harness	ASF	Driver side impact sensor harness to the driver door harness, in the driver door behind the trim panel	—	*X501 Driver Side Impact Sensor Jumper Harness to Driver Door Harness (ASF)*
X600	Passenger Door Harness to Body Harness	—	Passenger door harness to the body harness, behind the right kick panel	*Body Harness Routing - Right Front of Passenger Compartment*	*X600 Passenger Door Harness to Body Harness*
X601	Passenger Side Impact Sensor Jumper Harness to Passenger Door Harness	ASF	Passenger side impact sensor harness to the passenger door harness, in the passenger door behind the trim panel	—	*X601 Passenger Side Impact Sensor Jumper Harness to Passenger Door Harness (ASF)*
X901	Defogger Jumper Harness to Left Rear Cargo Door Harness	C49 with A12	Rear window defogger jumper harness to the left cargo door harness, in the left cargo door	*Rear Cargo Doors Harness Routing (Passenger or Cargo)*	*X901 Defogger Jumper Harness to Left Rear Cargo Door Harness (C49 with A12)*

X902	Rear Window Defogger Jumper Harness to Right Rear Cargo Door Harness	C49 with A12	Rear window defogger jumper harness to the right cargo door harness, in the right cargo door	*Rear Cargo Doors Harness Routing (Passenger or Cargo)*	—
G100	Forward Lamp Harness	—	Left front of the engine compartment, attached to the front of the left fender	*G100 and G101*	—
G101	Forward Lamp Harness	—	Right front of the engine compartment, attached near the front of the right fender	*G100 and G101*	—
G102	Engine Harness	L20, L96, or LC8	Rear of the engine compartment, left rear of the engine on the left cylinder head	• *G102 and G103 (LGH)* • *G102 and G103 (L20, L96, or LC8)*	—
G102	Engine Harness	LGH	Right side of engine compartment, on inner fender wall, behind right headlight	• *G102 and G103 (LGH)* • *G102 and G103 (L20, L96, or LC8)*	—
G103	Engine Harness	L20, L96, or LC8	Rear of the engine compartment, left rear of the engine on the left cylinder head	• *G102 and G103 (L20, L96, or LC8)* • *G102 and G103 (LGH)*	—
G103	Engine Harness	LGH	Right side of engine compartment, on inner fender wall, behind right headlight	• *G102 and G103 (L20, L96, or LC8)* • *G102 and G103 (LGH)*	—
G104	Negative Battery Cable	—	Mounted on the engine, extending towards the battery	—	—
G105	Negative Battery Cable	—	Front of the engine compartment, right front of the inner frame rail	—	—
G106	Negative Battery Cable	—	Front of the engine compartment, right front fender	—	—
G107	LPG Harness	KO7 with UFP	Left front lower side of the engine block	—	—
G108	LPG Harness	KO7	Left side inner frame rail	—	—
G109	Engine Harness	LGH	Right front lower side of the engine block	• *Engine Harness Routing - Right Front of Engine (LGH)* • *G109 (LGH)*	—
G110	Engine Harness	LGH	Mounted to the lower left front of the engine	• *G110 (LGH)* • *Engine Harness Routing - Left Front of Engine (LGH)*	—
G111	CNG Harness	FHZ	In the engine compartment, on right inner fender, near G103	—	—
G300	Chassis Harness	—	Left side outer frame, near the EBCM	• *G300 (L20, L96, or LC8)* • *Chassis Harness Routing (L20, L96, or LC8)* • *Chassis Harness Routing (LGH)*	—
G301	Instrument Panel	—	Left front of the passenger compartment, behind the kick panel next to G302	—	—
G302	Instrument Panel	—	Left front of the passenger compartment, behind the kick panel next to G301	*G302 and G347*	—

G304	Instrument Panel	—	Right front of the passenger compartment, behind the kick panel	*G304*	—
G305	Auxiliary Battery Negative Cable	TP2 or LGH	Left center outer frame rail, near the auxiliary battery	• *G305 (LGH or TP2)* • *Frame and Underbody Components (2 of 2, LGH)*	—
G347	Body Harness	—	Left side of the passenger compartment, lower left B-pillar part of JX347	*G302 and G347*	—
G348	Body Harness	—	Right side of the passenger compartment, lower right B-pillar part of JX348	—	—
G350	CNG Harness	FHZ	In vehicle underbody, near center, at rear of transmission case	—	—
G400	Chassis Harness	—	Left rear inner side frame rail	*G400 (1 of 2)*	—
G401	Body Harness	Passenger or Cargo	Right rear of the passenger compartment, upper right D-pillar	*G401 (Passenger or Cargo)*	—
G402	Body Harness	Passenger or Cargo	Left rear of the passenger compartment, center left D-pillar	*G402 (Passenger or Cargo)*	—
G403	Side Access Panel Harness	PRP	Left rear of the passenger compartment, center left D-pillar	—	—
J100	Forward Lamp Harness	—	At the left front of the engine compartment, just behind the left front headlamp assembly	—	—
J101	Engine Harness	—	In the engine harness, on the right side of the engine, approximately 5 cm (2 in) from the MAP sensor breakout	• *Engine Harness Routing - Left Rear of Engine (L20, L96, or LC8)* • *Engine Harness Routing - Left Side of Engine Compartment (LGH)*	—
J102	Engine Harness	—	In the engine harness, on the right side of the engine, approximately 6 cm (2 in) from the MAP sensor breakout	• *Engine Harness Routing - Left Side of Engine Compartment (LGH)* • *Engine Harness Routing - Left Rear of Engine (L20, L96, or LC8)*	—
J103	Chassis Harness	JL4	On the Chassis Harness, adjacent to K17 Electronic Brake Control Module	—	—
J110	Forward Lamp Harness	—	In the forward lamp harness, Left front of the vehicle, approximately 12 cm (5 in) from the left headlamp connector breakout	*Forward Lamp Harness Routing*	—
J115	Engine Harness	—	In the engine harness, in the right front of the engine compartment, approximately 15 cm (6 in) from the X101 breakout	• *Engine Harness Routing - Front (L20, L96, or LC8)* • *Engine Harness Routing - Left Side of Engine Compartment (LGH)*	—
J119	Chassis Harness	K08	In the chassis harness, near the left front inner frame rail, approximately 15 cm (6 in) from the coolant heater breakout	*Chassis Harness Routing (LGH)*	—
J121	Forward Lamp Harness	—	In the forward lamp harness, near the front center of the vehicle, approximately 48 cm (19 in) from the left headlamp breakout	*Forward Lamp Harness Routing*	—

J122	Forward Lamp Harness	—	In the forward lamp harness, near the left front of the vehicle, approximately 12 cm (5 in) from the underhood fuse block X4 breakout	*Forward Lamp Harness Routing*	—
J123	Engine Harness	—	In the engine harness, near the left front side of the vehicle, approximately 16 cm (6 in) from the underhood fuse block X1 breakout	• *Engine Harness Routing - Front (L20, L96, or LC8)* • *Engine Harness Routing - Left Side of Engine Compartment (LGH)*	—
J127	Transmission Internal Harness	—	Internal to T12 Automatic Transmission Assembly	—	—
J130	LPG Harness	KO7 with UFM	Integral to the LPG Harness	—	—
J140	Engine Harness	LGH with KD9	In-between G13E Generator - Auxiliary and K20 Engine Control Module	—	—
J143	Engine Harness	L20, L96, or LC8	Adjacent to B52C Heated Oxygen Sensor - Bank 1 Sensor 1 and B52E Heated Oxygen Sensor - Bank 2 Sensor 1	—	—
J144	Engine Harness	L20, L96, or LC8	Adjacent to B52D Heated Oxygen Sensor - Bank 1 Sensor 2 and B52F Heated Oxygen Sensor - Bank 2 Sensor 2	—	—
J145	Engine Harness	LGH	In the engine chassis harness, at the left front side of the engine compartment, approximately 4 cm (1.5 in) from the engine control module (ECM) X1 (LGH) breakout	—	—
J160	Engine Harness	LGH	In the engine harness, in the left front of the engine compartment, approximately 5.5 cm (2.2 in) from the X110 breakout	*Engine Harness Routing - Left Front of Engine (LGH)*	—
J161	Engine Harness	LGH	In the engine harness, in the left front of the engine compartment, approximately 6.5 cm (2.5 in) from the engine control module X2 connector breakout	*Engine Harness Routing - Left Side of Engine Compartment (LGH)*	—
J162	Engine Harness	LGH	In the engine harness, in the right front of the engine compartment, approximately 10 cm (3.9 in) from the G109 breakout	*Engine Harness Routing - Right Front of Engine (LGH)*	—
J163	Engine Harness	LGH	In the engine harness, in the right front of the engine compartment, approximately 23 cm (9 in) from the G109 breakout	*Engine Harness Routing - Right Front of Engine (LGH)*	—
J164	Engine Harness	LGH	In the engine jumper harness, in the left front of the engine compartment, approximately 9 cm (3.5 in) from the X110 connector	*Engine Harness Routing - Left Front of Engine (LGH)*	—
J167	LPG Harness	KO7 with UFM	In the LPG Main harness, first splice from battery positive ring terminal circuit	—	—
J168	LPG Harness	KO7 with UFM	In the LPG Main harness, near “Wait To Start” Lamp Relay	—	—
J169	LPG Harness	KO7 with UFM	In the LPG Main harness, in battery positive circuit closest to bulkhead, in underhood area	—	—
J170	LPG Harness	KO7 with UFM	In the LPG Main harness, dividing battery positive voltage between LPG Bypass Solenoid relay and vacuum pump	—	—

J171	LPG Harness	KO7 with UFM	In the LPG Main harness, inside vehicle, dividing battery positive voltage to LPG Control Module and circuit leading to LPG Control Module with resistor	—	—
J172	LPG Harness	KO7 with UFM	In the LPG Main harness, in battery positive voltage circuit, powering LPG Bypass Solenoid Relay	—	—
J173	LPG Harness	KO7	Integral to the LPG Harness	—	—
J174	LPG Harness	KO7	Integral to the LPG Harness	—	—
J176	LPG Harness	KO7 with UFM	In the LPG Main harness, in underhood area, dividing ground to LPG Bypass Solenoid	—	—
J179	LPG Harness	KO7 with UFM	In the LPG Main harness, inside of vehicle, closest to LPG Control Module dividing ground between module and Wait To Start Lamp	—	—
J182	Left Ignition Coil Harness	L20, L96, or LC8	In the odd ignition/coil module jumper harness, top left of the engine	—	—
J183	Right Ignition Coil Harness	L20, L96, or LC8	In the even ignition/coil module jumper harness, top right of the engine	—	—
J184	Left Ignition Coil Harness	L20, L96, or LC8	In the odd ignition/coil module jumper harness, top left of the engine	—	—
J185	Right Ignition Coil Harness	L20, L96, or LC8	In the even ignition/coil module jumper harness, top right of the engine	—	—
J188	Right Ignition Coil Harness	L20, L96, or LC8	In the even ignition/coil module jumper harness, top right of the engine	—	—
J196	CNG Harness	FHZ	In the engine compartment, splice in BK wire of CNG Harness	—	—
J197	CNG Harness	FHZ	In the engine compartment, splice in GN wire of CNG Harness	—	—
J198	CNG Jumper Harness	FHZ	In the passenger compartment, above the left front footwell	—	—
J199	CNG Jumper Harness	FHZ	In the passenger compartment, above the left front footwell	—	—
J202	Steering Column Harness	—	In the steering column harness, approximately 25 cm (9 in) from the X200 connector	—	—
J203	Steering Column Harness	—	In the steering column harness, approximately 27 cm (10.5 in) from the X200 connector	—	—
J205	Steering Column Harness	—	In the steering column harness, approximately 30 cm (12 in) from the X200 connector	—	—
J207	Instrument Panel	—	In the instrument panel harness, center of the instrument panel, approximately 70 cm (27 in) from the radio and HVAC control assembly breakout	*Instrument Panel Harness Routing - Dash Area (2 of 2)*	—
J208	Steering Wheel Harness	K34 with W1Y	In the steering wheel harness, near the X200 connector	—	—

J209	Steering Wheel Harness	K34 with W1Y	In the steering wheel harness, near the X200 connector	—	—
J210	Steering Wheel Harness	K34 or W1Y	In the steering wheel harness, near the X200 connector	—	—
J223	Instrument Panel	UVC without UI8	Adjacent to K9 Body Control Module	—	—
J231	Instrument Panel	—	In the instrument panel harness, left side of the instrument panel, approximately 5 cm (2 in) from the X200 breakout towards the instrument panel cluster connector	*Instrument Panel Harness Routing - Dash Area (2 of 2)*	—
J244	Instrument Panel	—	In the instrument panel harness, left side of the instrument panel, approximately 12 cm (5 in) from the X200 breakout towards the instrument panel cluster connector	*Instrument Panel Harness Routing - Dash Area (2 of 2)*	—
J245	Instrument Panel	DEB or DE5	In the instrument panel harness, center of the instrument panel, approximately 30 cm (12 in) from the radio and HVAC control assembly breakout	*Instrument Panel Harness Routing - Dash Area (2 of 2)*	—
J246	Instrument Panel	DEB or DE5	In the instrument panel harness, center of the instrument panel, approximately 43.5 cm (17 in) from the radio and HVAC control assembly breakout	*Instrument Panel Harness Routing - Dash Area (2 of 2)*	—
J247	Instrument Panel	—	In the instrument panel harness, left side of the instrument panel, approximately 36 cm (14.37 in) from the C200 breakout towards the underhood fuse block	*Instrument Panel Harness Routing - Dash Area (2 of 2)*	—
J248	Instrument Panel	—	In the instrument panel harness, left side of the instrument panel, approximately 8 cm (3.14 in) from the C200 breakout towards the instrument panel cluster connector	*Instrument Panel Harness Routing - Dash Area (2 of 2)*	—
J249	Instrument Panel	—	In the instrument panel harness, right side of the instrument panel, approximately 21 cm (8 in) from the G304 breakout	*Instrument Panel Harness Routing - Dash Area (2 of 2)*	—
J250	Instrument Panel	—	In the instrument panel harness, right side of the instrument panel, approximately 5 cm (2.16 in) from the air temperature actuator connector breakout towards the inflatable restraint instrument panel module connector	*Instrument Panel Harness Routing - Dash Area (2 of 2)*	—
J263	Instrument Panel	TP2	In the instrument panel harness, left side of the instrument panel, approximately 36 cm (14.37 in) from the C200 breakout towards the underhood fuse block	—	—
J264	Steering Column Harness	—	In the steering wheel harness, approximately 20 cm (8 in) from the X200 connector	—	—
J270	Instrument Panel	U2K or UBS	In the instrument panel harness, approximately 15 cm (6 in) from the digital radio receiver and cigar lighter connectors breakout	—	—
J271	Instrument Panel	U2K, UBS, or UE1	In the instrument panel harness, approximately 7.5 cm (3 in) from the vehicle communication interface module and cigar lighter connectors breakout	—	—

J280	Instrument Panel	Cutaway without YF7	In the instrument panel harness, approximately 20 cm (7.9 in) from the body fuse block and air bag module connectors breakout	—	—
J300	Side Access Panel Harness	PRP	Slightly forward of X53A Fuse Block - Rear Body	—	—
J301	Chassis Harness	L20, L96, or LC8	In the chassis harness, left side frame, approximately 21 cm (8 in) from the fuel pump connector breakout	*Chassis Harness Routing (L20, L96, or LC8)*	—
J302	Instrument Panel	PRP	Adjacent to K9 Body Control Module	—	—
J307	Front Headliner Harness	C69 or YF7	In the front headliner harness, center of the headliner, approximately 15 cm (6 in) from the X205 breakout towards the left vanity mirror lamp connector	—	—
J308	Body Harness	C69	In the body harness, left side of the passenger compartment, approximately 22 cm (9 in) from the breakout for the door jamb switch LR side	*Body Harness Routing - Rear Overview (Passenger or Cargo)*	—
J309	Side Access Panel Harness	PRP	Adjacent to X53A Fuse Block - Rear Body	—	—
J310	Body Harness	C69	In the body harness, left side of the passenger compartment, approximately 32 cm (12.79 in) from the breakout for the door jamb switch left rear side	*Body Harness Routing - Rear Overview (Passenger or Cargo)*	—
J311	Body Harness	C69	In the body harness, left side of the passenger compartment, approximately 5 cm (2 in) from the door jamb switch LR side breakout	*Body Harness Routing - Rear Overview (Passenger or Cargo)*	—
J314	Front Headliner Harness	—	In the front headliner harness, center of the headliner, approximately 22 cm (8.5 in) from the X205 breakout towards the left vanity mirror lamp connector	—	—
J315	Chassis Harness	—	In the chassis harness, left side frame, approximately 31 cm (12 in) from the G300 breakout	• *Chassis Harness Routing (LGH)* • *Chassis Harness Routing (L20, L96, or LC8)*	—
J322	Body Harness	AU3	In the body harness, near the front passenger seat, approximately 40 cm (16 in) from the X306 breakout	—	—
J323	Body Harness	AU3	In the body harness, near the front passenger seat, approximately 20 cm (8 in) from the X306 breakout	—	—
J330	Rear Headliner Harness	Passenger	In the rear headliner harness, center of the headliner, approximately 30 cm (12 in) to the courtesy reading lamp rear breakout	—	—
J331	Body Harness	Passenger	In the body harness, near the front passenger seat, approximately 15 cm (6 in) from the X306 breakout	*Body Harness Routing - Rear Overview (Passenger or Cargo)*	—
J332	Front Headliner Harness	DH6 with YF7	In the front headliner harness, center of the headliner, approximately 11 cm (4 in) from the front right sunshade breakout	—	—
J333	Front Headliner Harness	DH6 without YF7	In the front headliner harness, center of the headliner, approximately 20 cm (8 in) from the right sunshade breakout	—	—

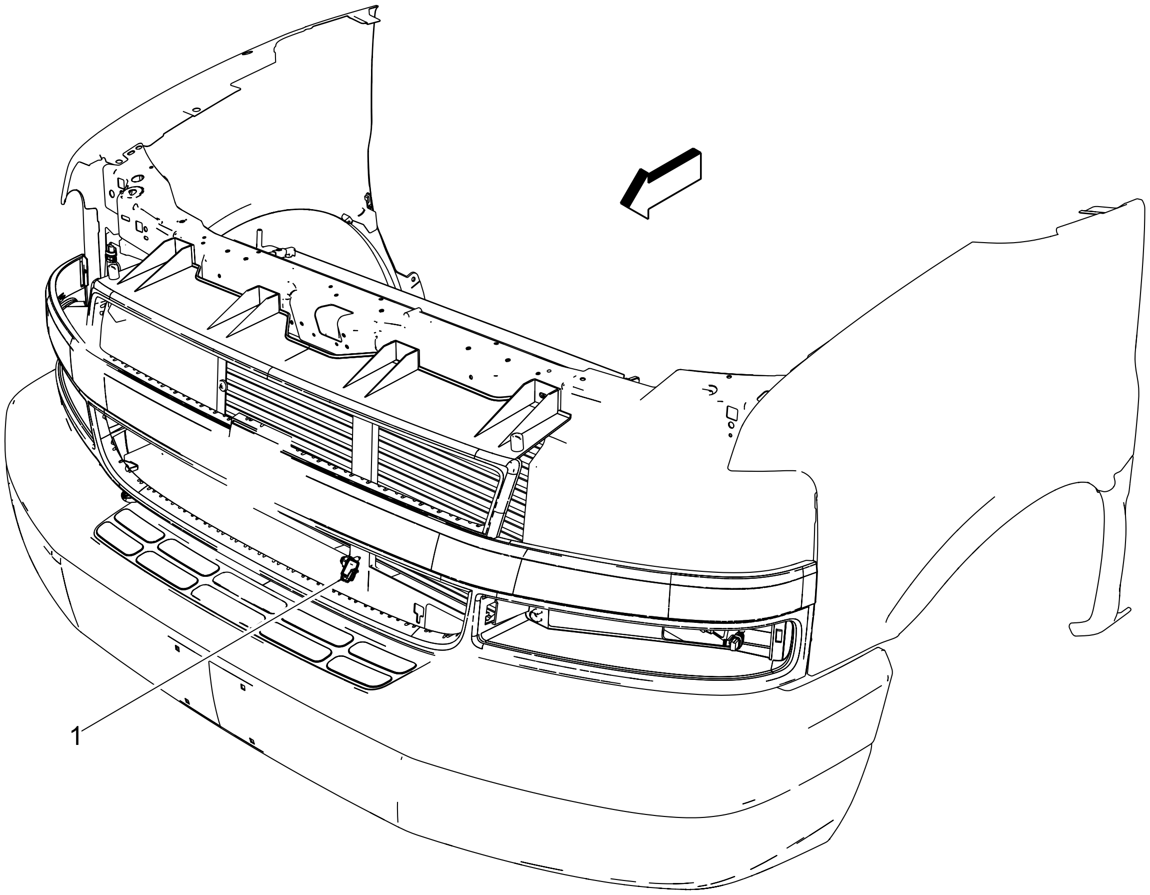
J334	Body Harness	UVC	Approximately 5” rearward of X53A Fuse Block - Rear Body	—	—
J348	Side Access Panel Harness	PRP	In the cargo area, in-between the headliner and the roof, in-between the left side access panel and the right side access panel	—	—
J350	Side Access Panel Harness	PRP with UF2	In the cargo area, in-between the headliner and the roof, in-between the left side access panel and the right side access panel	—	—
J355	Front Headliner Harness	YF7	In the front headliner harness, center of the headliner, approximately 61 cm (24 in) from the X205 breakout towards the left vanity mirror lamp connector	—	—
J356	Body Harness	—	In the body harness, on the left front side of the vehicle, approximately 20 cm (7.87 in) from the underhood fuse block breakout	• *Body Harness Routing - Rear Overview (Passenger or Cargo)* • *Body Harness Routing - Left Front of Passenger Compartment*	—
J361	LPG Harness	KO7 with UFP	In the LPG chassis harness, about 12.7 cm (5 inches) from LPG Control Module	—	—
J362	LPG Harness	KO7 with UFP	In the LPG chassis harness, about 30.48 cm (12 inches) from Primary Liquid Propane Delivery Module	—	—
J363	LPG Harness	KO7 with UFP	In the LPG chassis harness, about 7.62 cm (3 inches) from Primary Fuel Pump Relay	—	—
J364	LPG Harness	KO7 with UFP	In the LPG chassis harness, about 12.7 cm (5 inches) from Primary Fuel Pump Relay	—	—
J365	LPG Harness	KO7 with UFP	In the LPG chassis harness, about 7.62 cm (3 inches) from Scavenge Fuel Pump Relay	—	—
J366	LPG Harness	KO7 with UFP	In the LPG chassis harness, about 12.7 cm (5 inches) from Scavenge Fuel Pump Relay	—	—
J367	LPG Harness	KO7 with UFP	In the LPG chassis harness, about 7.62 cm (3 inches) from Secondary Fuel Pump Relay	—	—
J368	LPG Harness	KO7 with UFP	In the LPG chassis harness, about 434.4 cm (171 inches) from G105	—	—
J369	LPG Harness	KO7 with UFP	In the LPG chassis harness, about 7.62 cm (3 inches) from Primary Fuel Level Sensor	—	—
J370	Body Harness	UVC without UI8	In the body harness, approximately 27.5 cm (10.8 in) from the Yaw and Lateral Accelerometer Sensor towards Fuse Block - Body	*Body Harness Routing - Left Front of Passenger Compartment*	—
J371	Body Harness	UVC without UI8	In the body harness, approximately 32.5 cm (12.8 in) from the Yaw and Lateral Accelerometer Sensor towards Fuse Block - Body	*Body Harness Routing - Left Front of Passenger Compartment*	—
J372	Body Harness	UVC without UI8	In the body harness, approximately 22.5 cm (8.9 in) from the Yaw and Lateral Accelerometer Sensor towards Fuse Block - Body	*Body Harness Routing - Left Front of Passenger Compartment*	—
J373	Body Harness	Passenger	At the base of the right C-pillar	—	—
J377	Side Access Panel Harness	PRP	Adjacent to X53A	—	—

J378	Side Access Panel Harness	PRP	Adjacent to X53A	—	—
J401	Body Harness	C36, C49, or C69	In the body harness, in the left rear of the vehicle, approximately 21 cm (8 in) from the X401 breakout	*Body Harness Routing - Rear Overview (Passenger or Cargo)*	—
J402	Chassis Harness	—	In the chassis harness, left frame, approximately 20 cm (7.87 in) from the G400 breakout towards the EBCM connector	*Chassis Harness Routing (L20, L96, or LC8)*	—
J403	Body Harness	—	In the body harness, left rear of the passenger compartment, approximately 18.5 cm (7 in) from the X402 breakout	• *Body Harness Routing - Right Rear (Passenger or Cargo)* • *Body Harness Routing - Rear Overview (Passenger or Cargo)*	—
J404	Chassis Harness	L20, L96, or LC8	In the chassis harness, left frame, approximately 10 cm (4 in) from the G400 breakout towards the EBCM connector	—	—
J405	Rear HVAC Harness	C36 or C69	In the rear HVAC harness, left rear of the passenger compartment, approximately 13 cm (5.31 in) from the auxiliary blower motor relay breakout towards X409	—	—
J407	Rear Headliner Harness	—	In the rear headliner harness, center of the headliner, approximately 6.5 cm (2.5 in) from X304 towards the rear courtesy/reading lamp connector	—	—
J408	Side Access Panel Harness	PRP	In the Left Side Access Panel compartment	—	—
J409	Side Access Panel Harness	PRP	In the Right Side Access Panel compartment	—	—
J410	Body Harness	—	In the body harness, in the left rear of the vehicle, approximately 47 cm (18 in) from the X401 breakout	• *Body Harness Routing - Left Rear (Passenger or Cargo)* • *Body Harness Routing - Rear Overview (Passenger or Cargo)*	—
J411	Rear HVAC Harness	C69	In the rear HVAC harness, left rear of the passenger compartment, approximately 20 cm (8 in) from the blower motor relay breakout, towards X409	—	—
J412	Rear HVAC Harness	C36, C69, or ENC	In the rear HVAC harness, left rear of the passenger compartment, approximately 7 cm (2.8 in) from the blower motor relay breakout towards X409	—	—
J413	Rear HVAC Harness	C69	In the rear HVAC harness, left rear of the passenger compartment, approximately 10 cm (4 in) from the auxiliary blower motor resistor assembly breakout	—	—
J420	Rear Bumper Harness	UD7	In the rear bumper harness, approximately 57 cm (22 in) from the right rear middle object alarm sensor towards the left rear corner object alarm sensor	—	—
J421	Rear Bumper Harness	UD7	In the rear bumper harness, approximately 15 cm (6 in) from the left rear corner object alarm sensor towards the right rear middle object alarm sensor	—	—

J430	LPG Harness	KO7 with UFM	In the LPG Fuel Tank harness, about 1778 mm (70 inches) from X350	—	—
J431	LPG Harness	KO7 with UFM	In the LPG Fuel Tank harness, about 152.4 mm (6 inches) from X180	—	—
J432	LPG Harness	KO7 with UFM	In the LPG Fuel Tank harness, about 279.4 mm (11 inches) from Fuel Supply Solenoid	—	—
J450	Body Harness	US8, YF2, or YF7	In the body harness, in the rear of the vehicle, approximately 10 cm (3.93 in) from the X415 breakout	• *Body Harness Routing - Right Rear (Passenger or Cargo)* • *Body Harness Routing - Rear Overview (Passenger or Cargo)*	—
J451	Body Harness	YF2 or YF7	In the body harness, in the rear of the vehicle, approximately 17 cm (6.5 in) from the X415 breakout	• *Body Harness Routing - Right Rear (Passenger or Cargo)* • *Body Harness Routing - Rear Overview (Passenger or Cargo)*	—
J452	Body Harness	US8, YF2, or YF7	In the body harness, approximately 17 cm (6.5 in) from the X419 breakout	• *Body Harness Routing - Right Rear (Passenger or Cargo)* • *Body Harness Routing - Rear Overview (Passenger or Cargo)*	—
J453	Body Harness	YF2 or YF7	In the body harness, in the left rear of the vehicle, approximately 10 cm (4 in) from the X419 breakout	• *Body Harness Routing - Rear Overview (Passenger or Cargo)* • *Body Harness Routing - Right Rear (Passenger or Cargo)*	—
J460	Chassis Harness	UY7 with NE7	In the chassis harness, in the rear of the vehicle, approximately 15.5 cm (6.1 inches) from trailer harness breakout	—	—
J500	Driver Door Harness	AU3, DEB, DE5, or A31	In the left front door harness, driver door, approximately 7 cm (3 in) from the left front door speaker breakout	—	—
J501	Driver Door Harness	AU3	In the left front door harness, driver door, approximately 6 cm (2.36 in) from the driver outside rearview mirror breakout	—	—
J502	Driver Door Harness	DEB or DE5	In the left front door harness, driver door, approximately 4 cm (2 in) from the left front door speaker breakout	—	—
J600	Passenger Door Harness	AU3, DEB, DE5, or A31	In the right front door harness, front passenger door, approximately 4 cm (2 in) from the passenger outside rearview mirror breakout	—	—
J601	Passenger Door Harness	AU3	In the right front door harness, front passenger door, approximately 5 cm (2 in) from the passenger outside rearview mirror breakout	—	—
J901	Right Rear Cargo Door Harness	AU3	In the rear cargo door harness, approximately 4 cm (1.5 in) from the X902 breakout	—	—
J902	Right Rear Cargo Door Harness	C49	In the right rear door harness, right rear cargo door, approximately 12 cm (4.7 in) from the X902 breakout	*Rear Cargo Doors Harness Routing (Passenger or Cargo)*	—

JX200	Instrument Panel Harness	—	In the instrument panel harness, left front side of the floor, where the carpet ends behind the brake pedal next to JX250	*Instrument Panel Harness Routing - Dash Area (1 of 2)*	—
JX250	Instrument Panel Harness	—	In the instrument panel harness, left front side of the floor, where the carpet ends behind the brake pedal next to JX200	*Instrument Panel Harness Routing - Dash Area (1 of 2)*	—
JX347	Body Harness	—	In the body harness, left side of the passenger compartment, attached to the lower left B-pillar part of G347	*Body Harness Routing - Left Front of Passenger Compartment*	—
JX348	Body Harness	—	In the body harness, right side of the passenger compartment, attached to the lower right B-pillar part of G348	*Body Harness Routing - Right Front of Passenger Compartment*	—

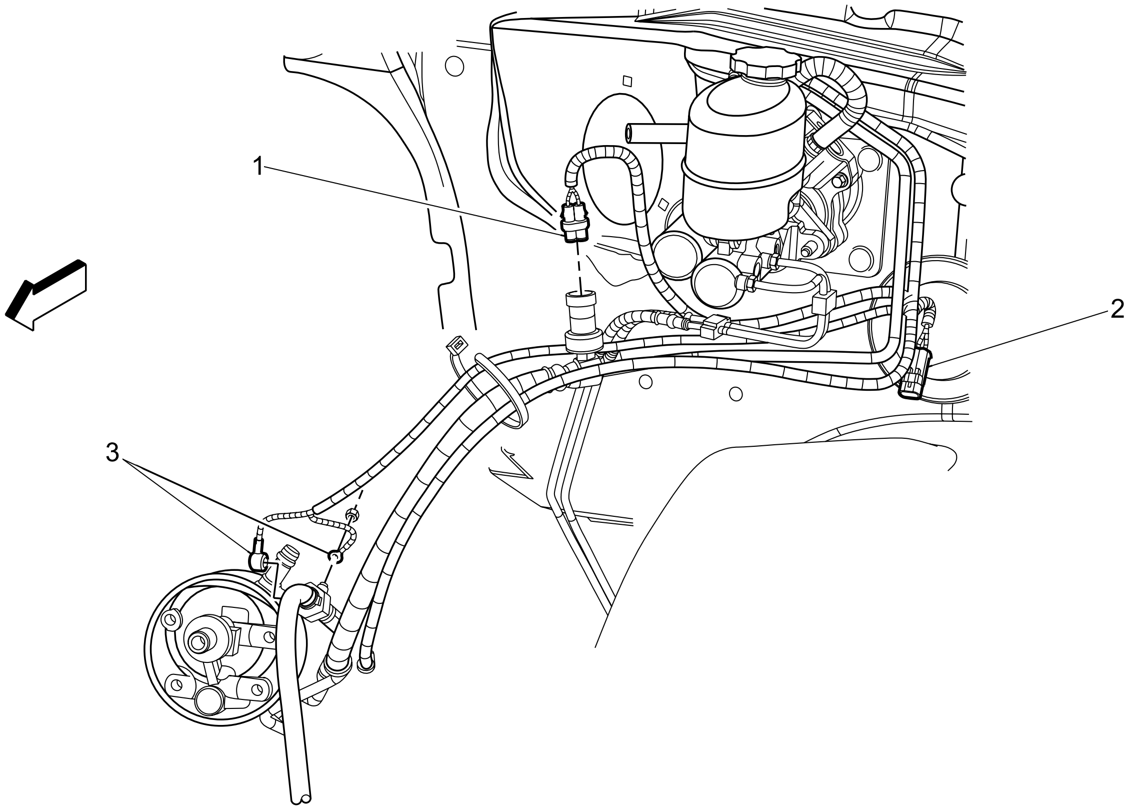
Ambient Air Temperature Sensor (UFA)



Items

1. B9 Ambient Air Temperature Sensor

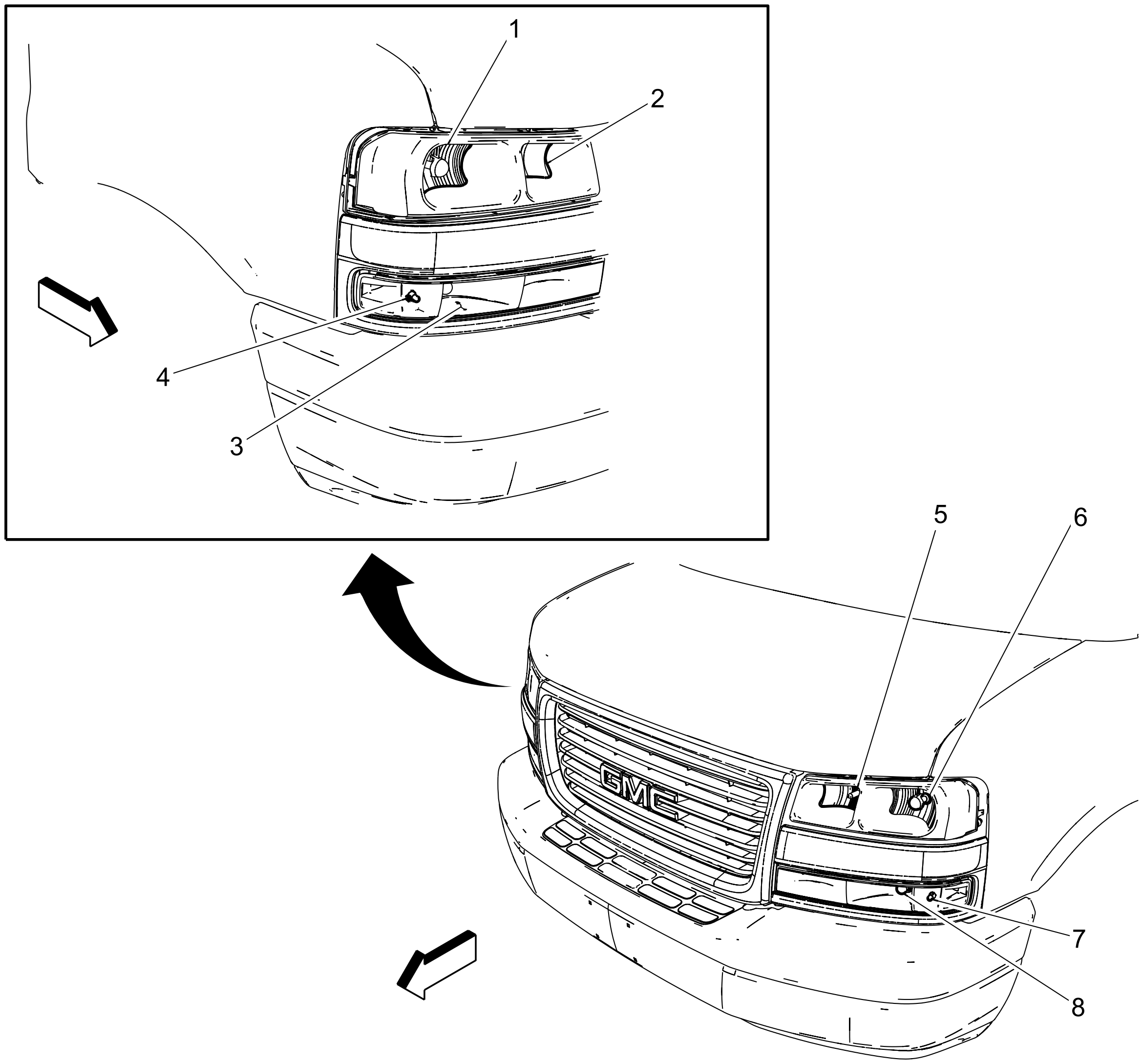
Brake Booster Fluid Alarm Switches (UJ1)



Items

1. B19A Brake Booster Fluid Pressure Alarm Switch
2. X141
3. B133 Brake Booster Fluid Flow Alarm Switch

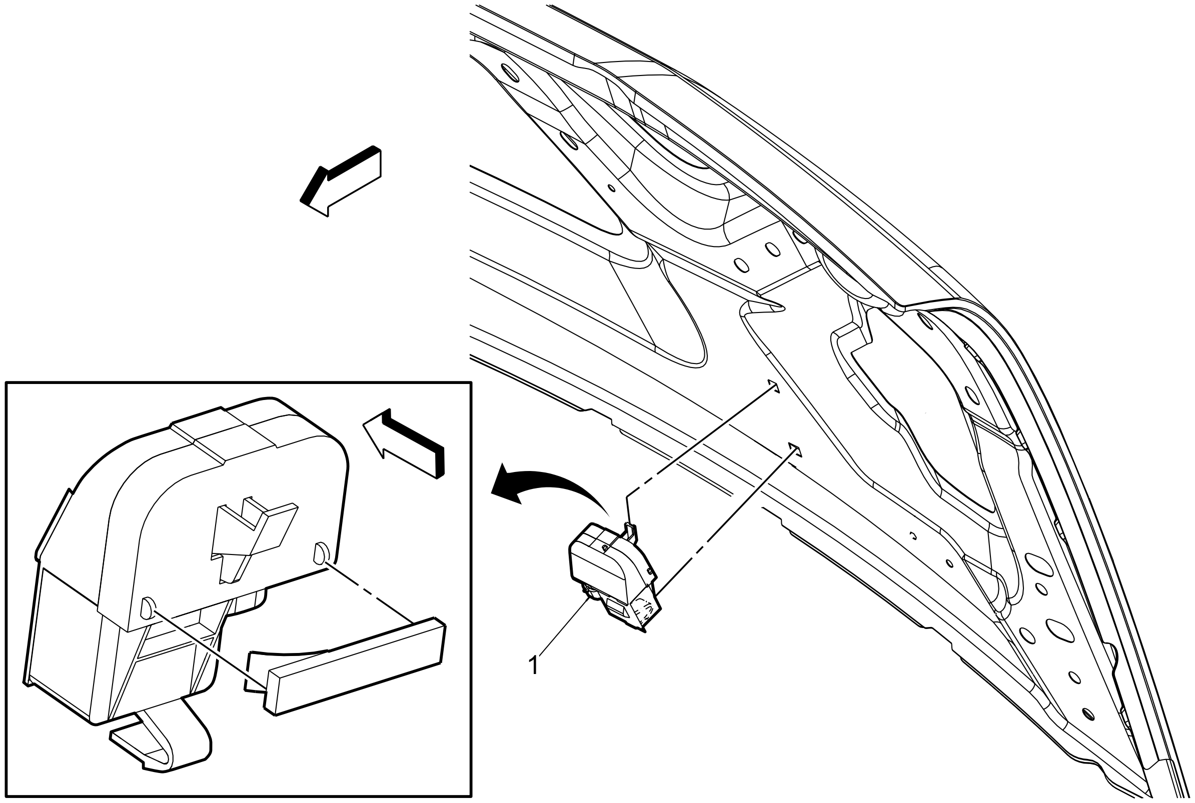
Front Exterior Lighting (Uplevel)



Items

1. E4H Headlamp - Right Low Beam
2. E4F Headlamp - Right High Beam
3. E4P Park/Turn Signal Lamp - Right
4. E2RF Side Marker Lamp - Right Front
5. E4E Headlamp - Left High Beam
6. E4G Headlamp - Left Low Beam
7. E2LF Side Marker Lamp - Left Front
8. E4N Park/Turn Signal Lamp - Left

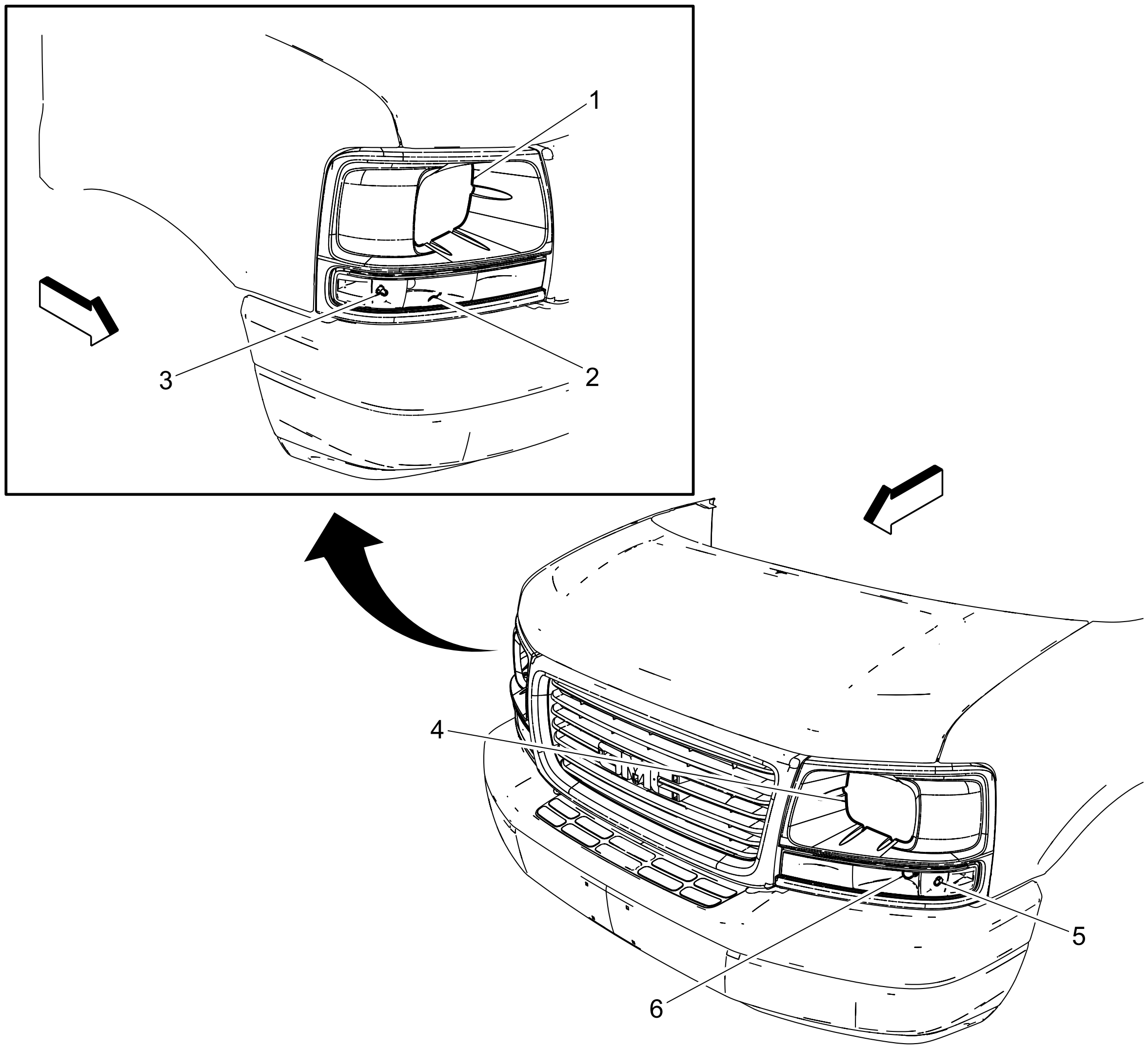
Underside of Hood Components



Items

1. E22 Underhood Lamp

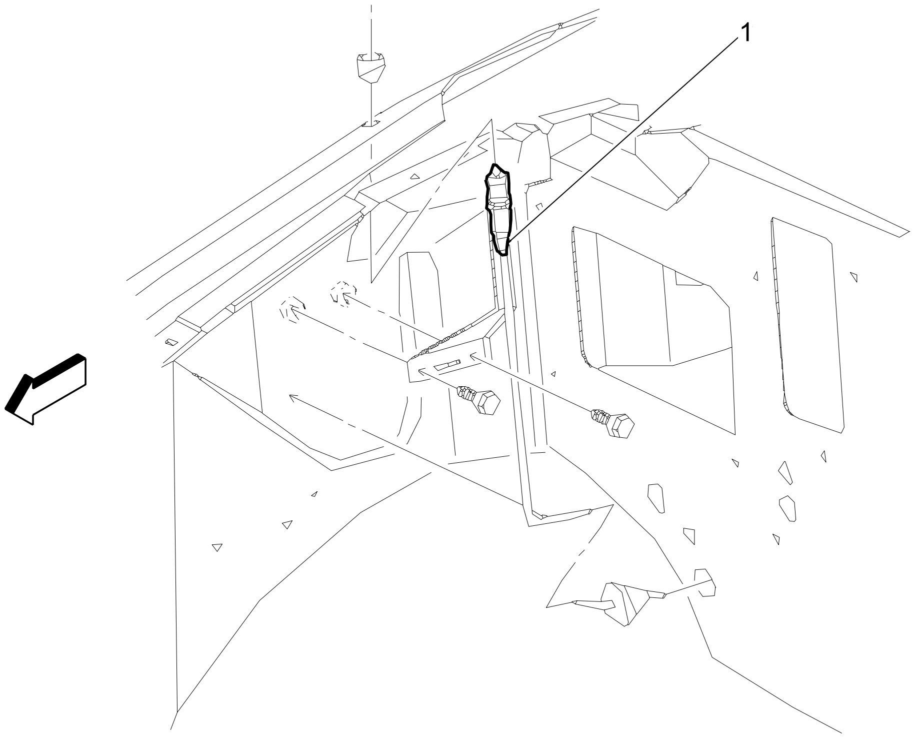
Front Exterior Lighting (Base)



Items

1. E13R Headlamp - Right
2. E4P Park/Turn Signal Lamp - Right
3. E2RF Side Marker Lamp - Right Front
4. E13L Headlamp - Left
5. E2LF Side Marker Lamp - Left Front
6. E4N Park/Turn Signal Lamp - Left

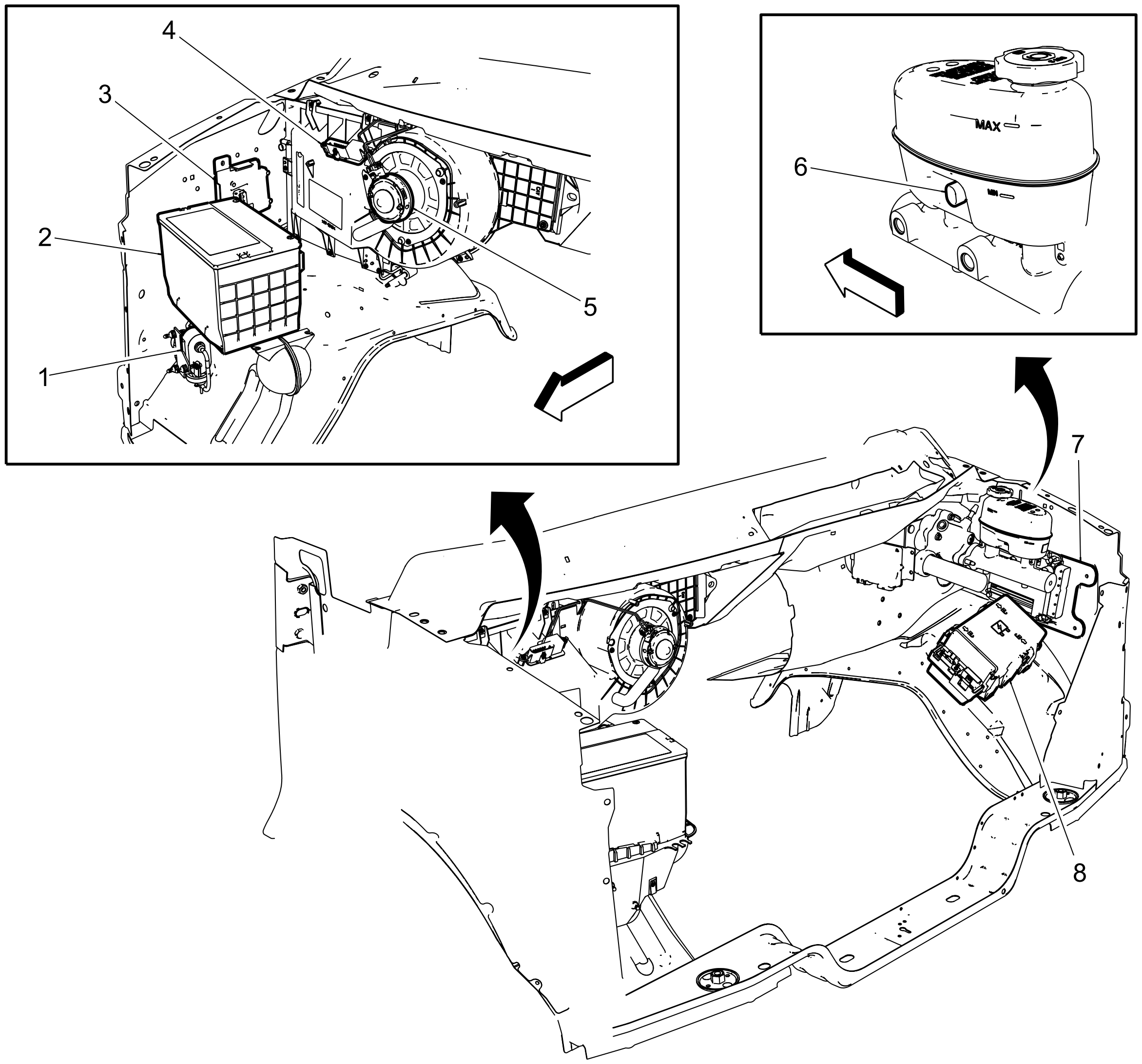
Right Rear of the Engine Compartment Components



Items

1. T4M Radio Antenna

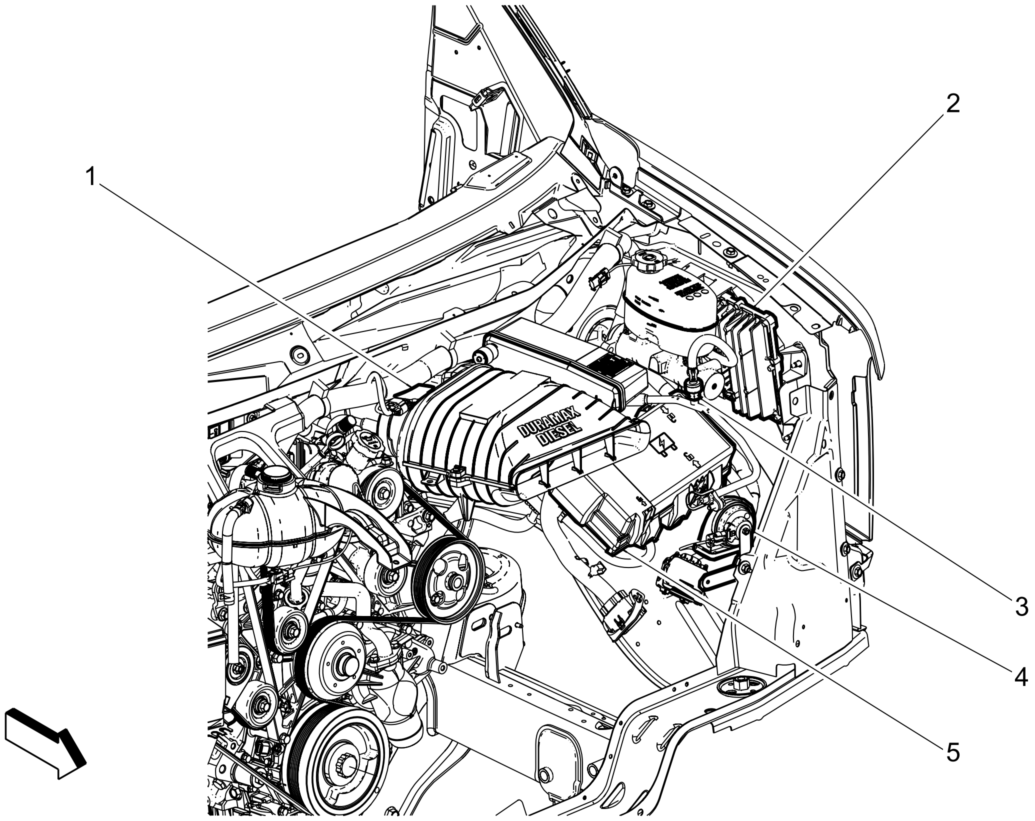
Engine Compartment Components (1 of 2)



Items

1. G34 Evaporative Emission System Leak Detection Pump
2. C1 Battery
3. K71 Transmission Control Module
4. R3 Blower Motor Resistor
5. M8 Blower Motor
6. B20 Brake Fluid Level Switch
7. K20 Engine Control Module
8. X50A Fuse Block - Underhood

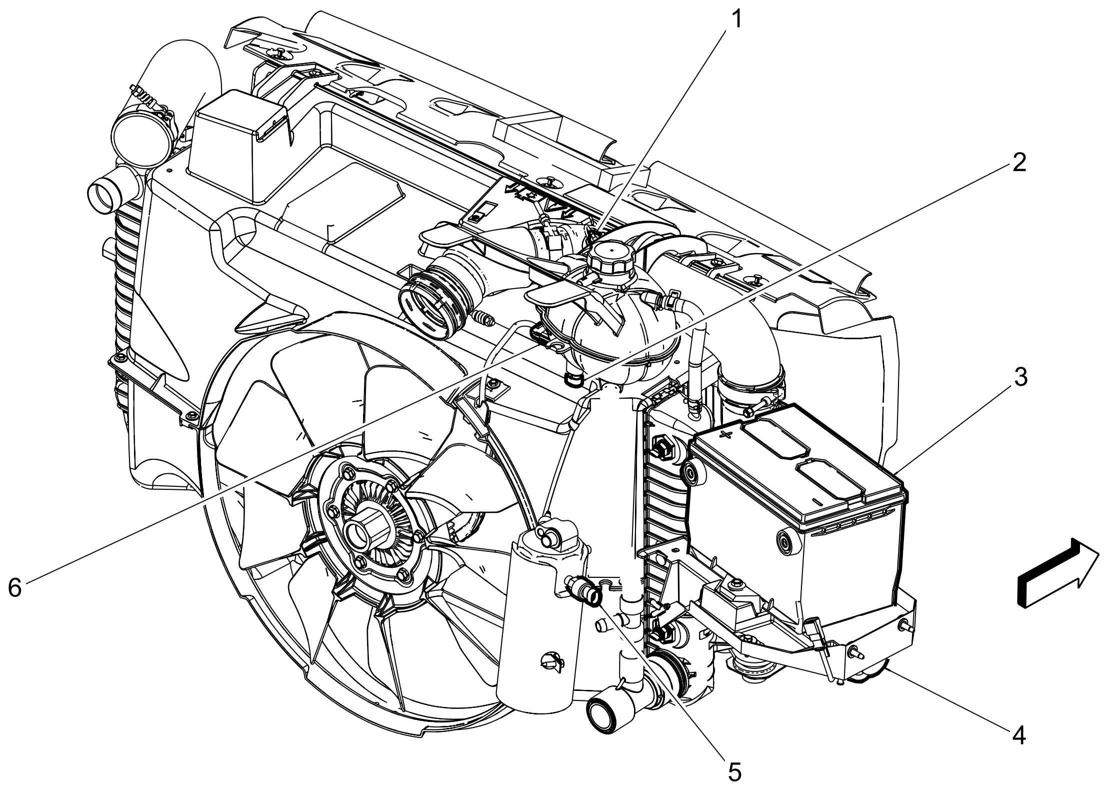
Engine Compartment Components (2 of 2, LGH)



Items

1. B75B Mass Air Flow/Intake Air Temperature Sensor
2. K20 Engine Control Module
3. B1 A/C Refrigerant Pressure Sensor
4. P13 Horn Assembly
5. X50A Fuse Block - Underhood

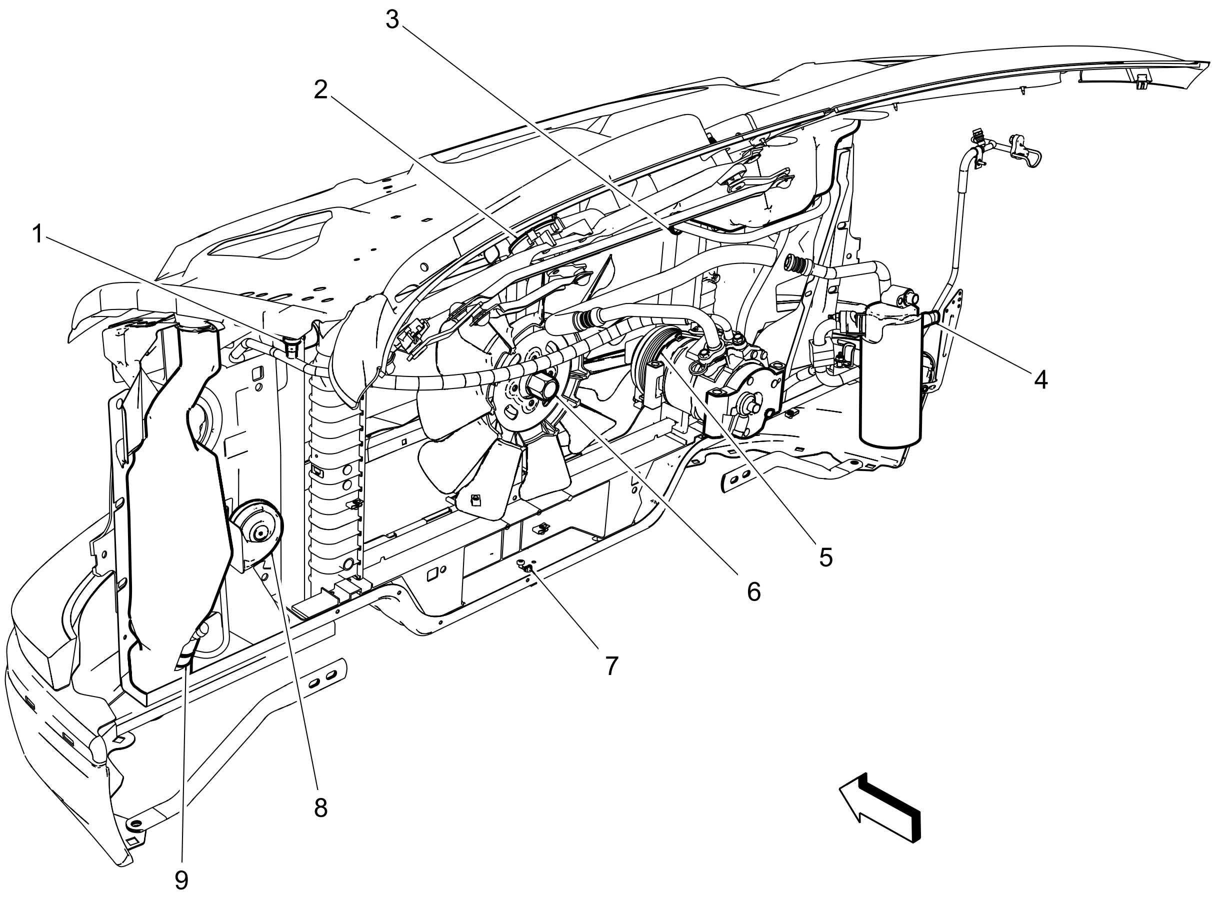
Front of Engine Compartment Components (2 of 2, LGH)



Items

1. B193B Charge Air Cooler Outlet Temperature Sensor
2. B33 Engine Coolant Level Switch
3. C1 Battery
4. G34 Evaporative Emission System Leak Detection Pump
5. B1B A/C Low Side Pressure Switch
6. X142

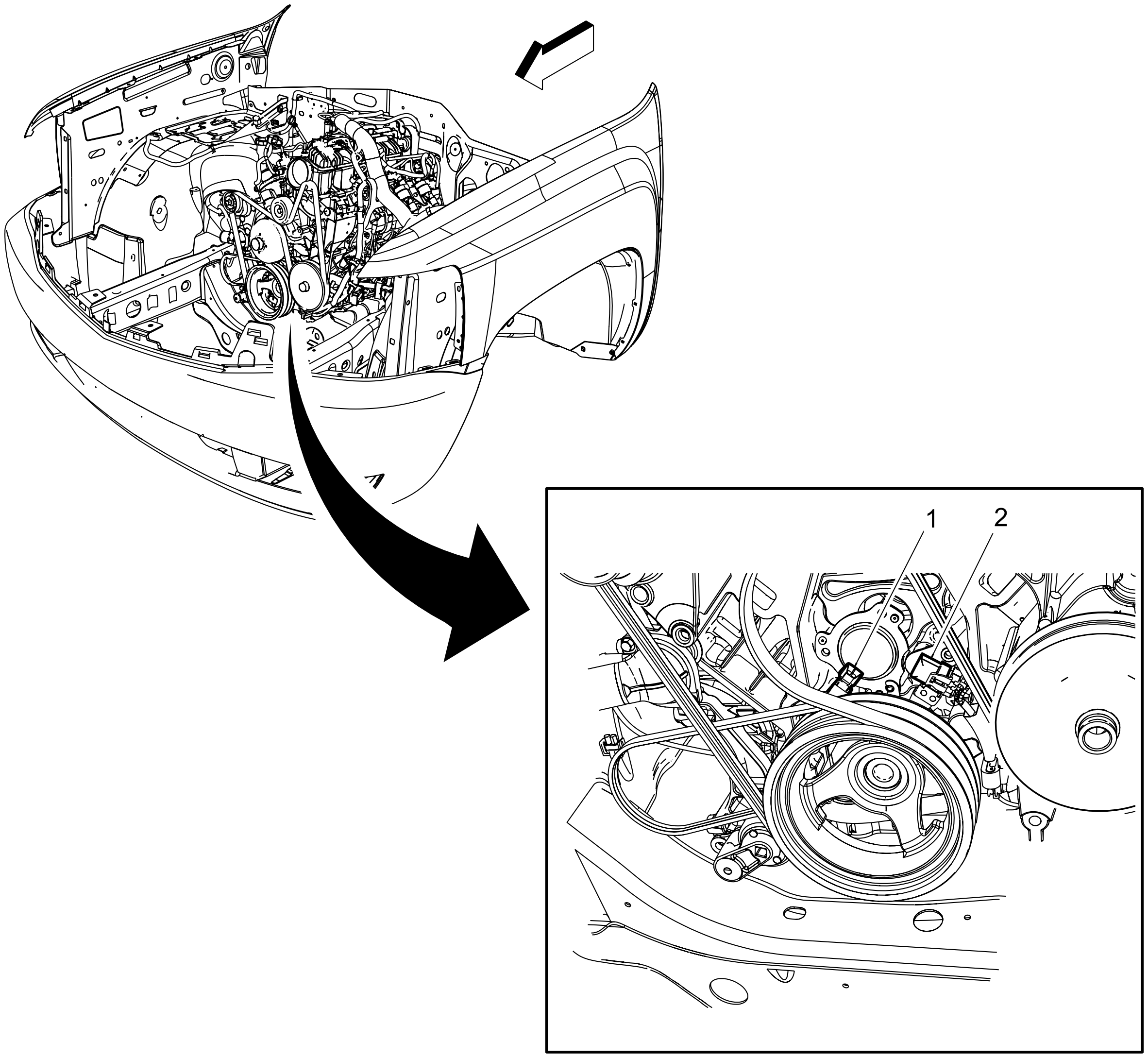
Front of Engine Compartment Components (1 of 2)



Items

1. B1 A/C Refrigerant Pressure Sensor
2. M75 Windshield Wiper Motor
3. B33 Engine Coolant Level Switch
4. B1B A/C Low Side Pressure Switch
5. Q2 A/C Compressor Clutch
6. G10 Cooling Fan Motor
7. B59 Front Impact Sensor
8. P13 Horn Assembly
9. G24 Windshield Washer Pump

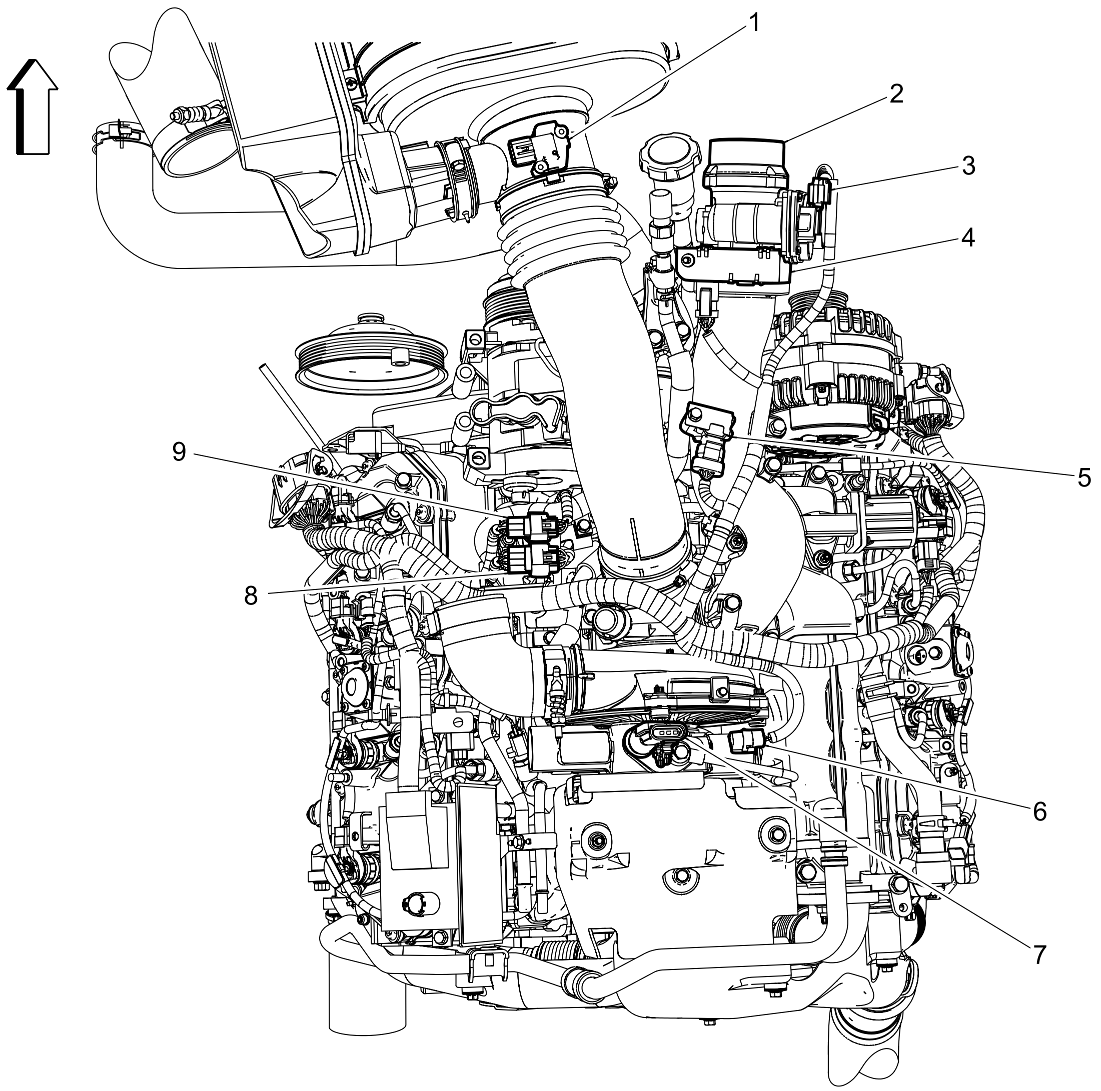
Left Front Side of the Engine Components (1 of 2, L20, L96, or LC8)



Items

1. Q6 Camshaft Position Actuator Solenoid Valve
2. B23 Camshaft Position Sensor

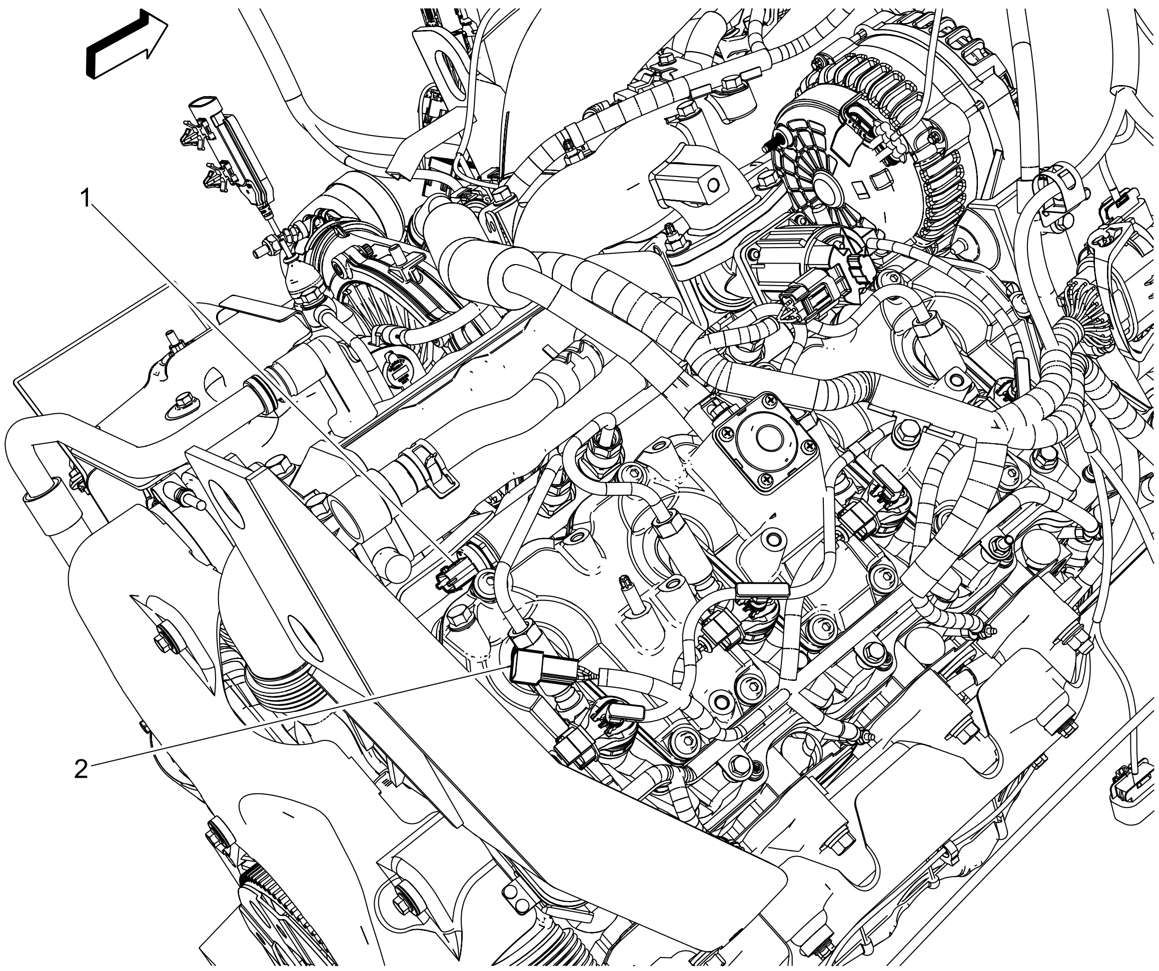
Top of the Engine Components (1 of 3, LGH)



Items

1. B75B Mass Air Flow/Intake Air Temperature Sensor
2. Q38 Throttle Body
3. Q20 Intake Air Flow Valve
4. E24 Intake Air Heater
5. B74 Manifold Absolute Pressure Sensor
6. Q41 Turbocharger Vane Position Control Solenoid Valve
7. B112 Turbocharger Vane Position Sensor
8. X110
9. X112

Top of the Engine Components (3 of 3, LGH)

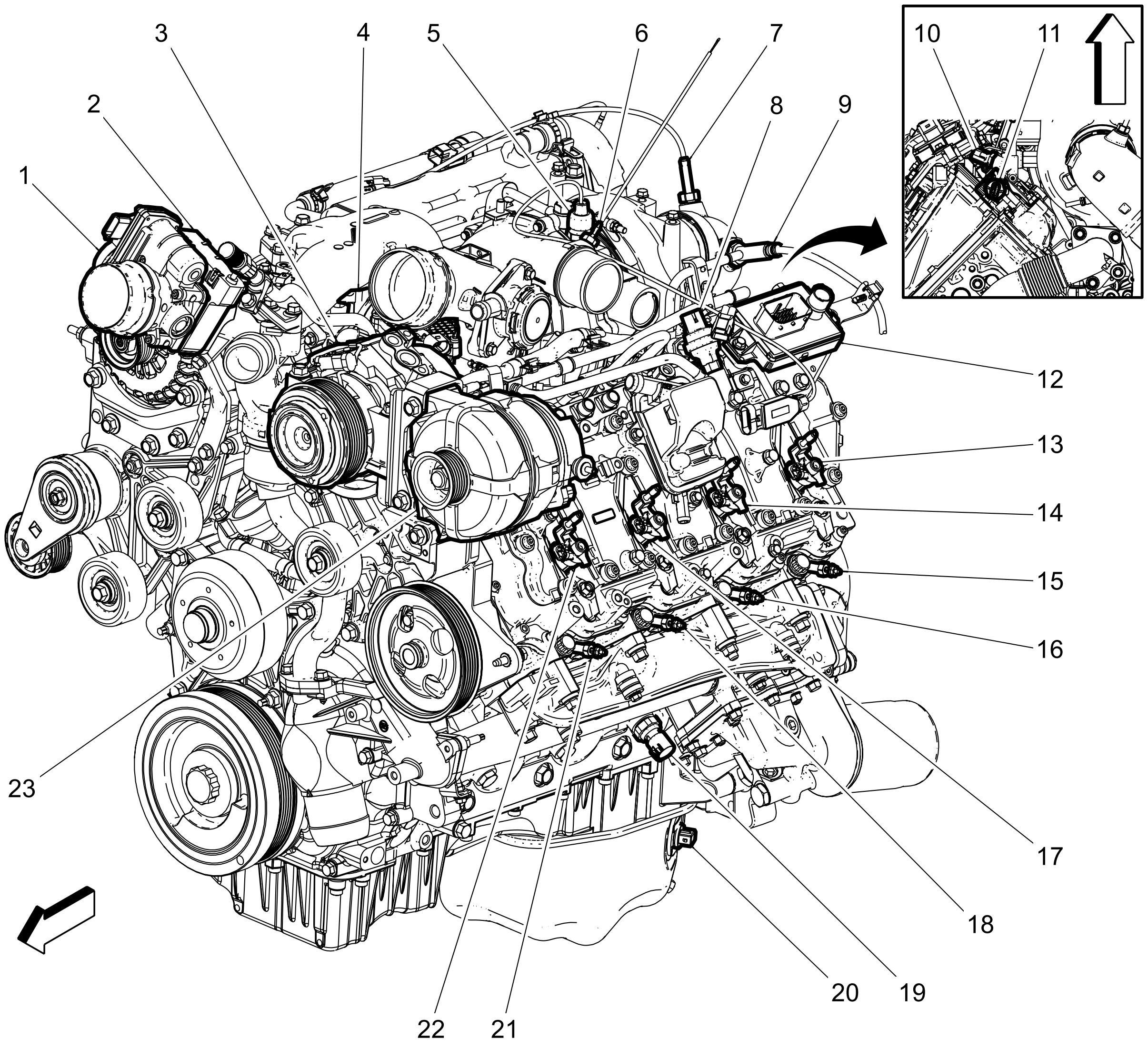


Items

1. B47B Fuel Rail Pressure Sensor

2. X112

Left Front of the Engine Components (LGH)

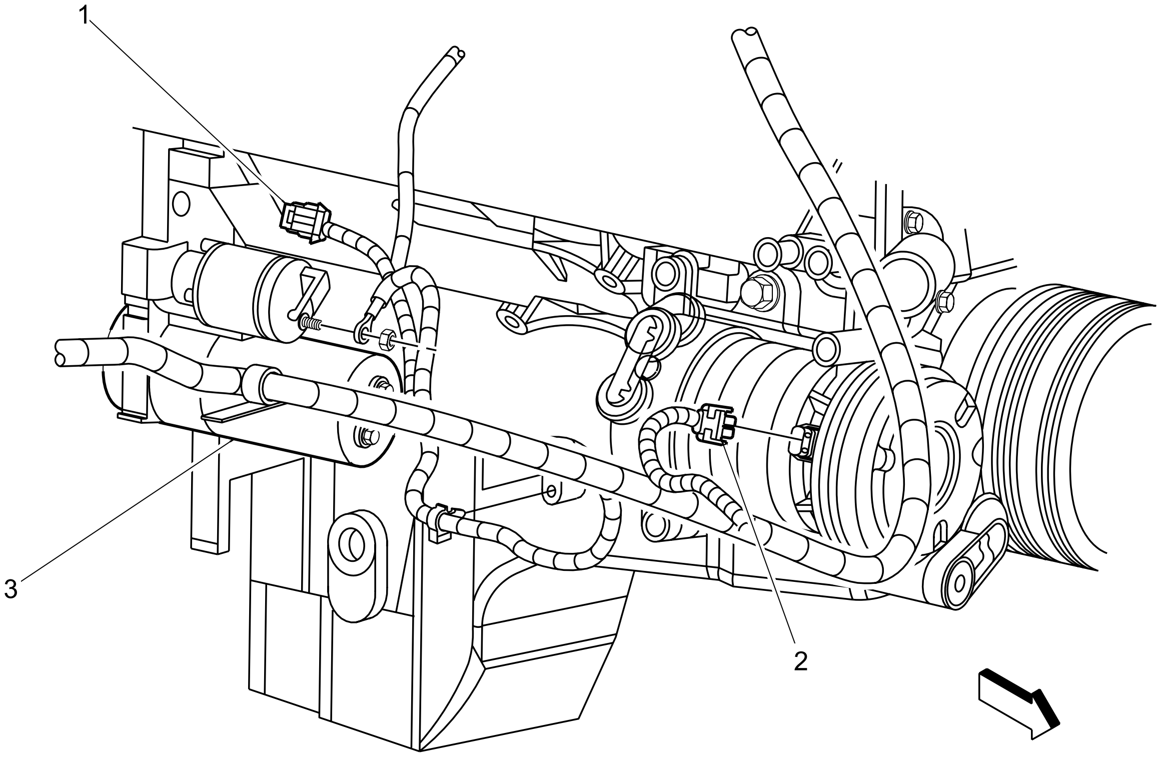


Items

1. Q20 Intake Air Flow Valve
2. E24 Intake Air Heater
3. Q2 A/C Compressor Clutch
4. Q14 Exhaust Gas Recirculation Valve
5. B112 Turbocharger Vane Position Sensor
6. B193A Charge Air Cooler Inlet Temperature Sensor
7. B130A Exhaust Gas Recirculation Temperature Sensor 1
8. B215 Fuel Filter Pressure Switch
9. B195A Nitrogen Oxides Sensor 1
10. B48B Fuel Temperature Sensor 2
11. B47B Fuel Rail Pressure Sensor

11. B47B Fuel Rail Pressure Sensor
12. K34 Glow Plug Control Module
13. Q17H Fuel Injector 8
14. Q17F Fuel Injector 6
15. E12H Glow Plug 8
16. E12F Glow Plug 6
17. Q17D Fuel Injector 4
18. E12D Glow Plug 4
19. B37B Engine Oil Pressure Sensor
20. B35 Engine Oil Level Switch
21. E12B Glow Plug 2
22. Q17B Fuel Injector 2
23. G13 Generator

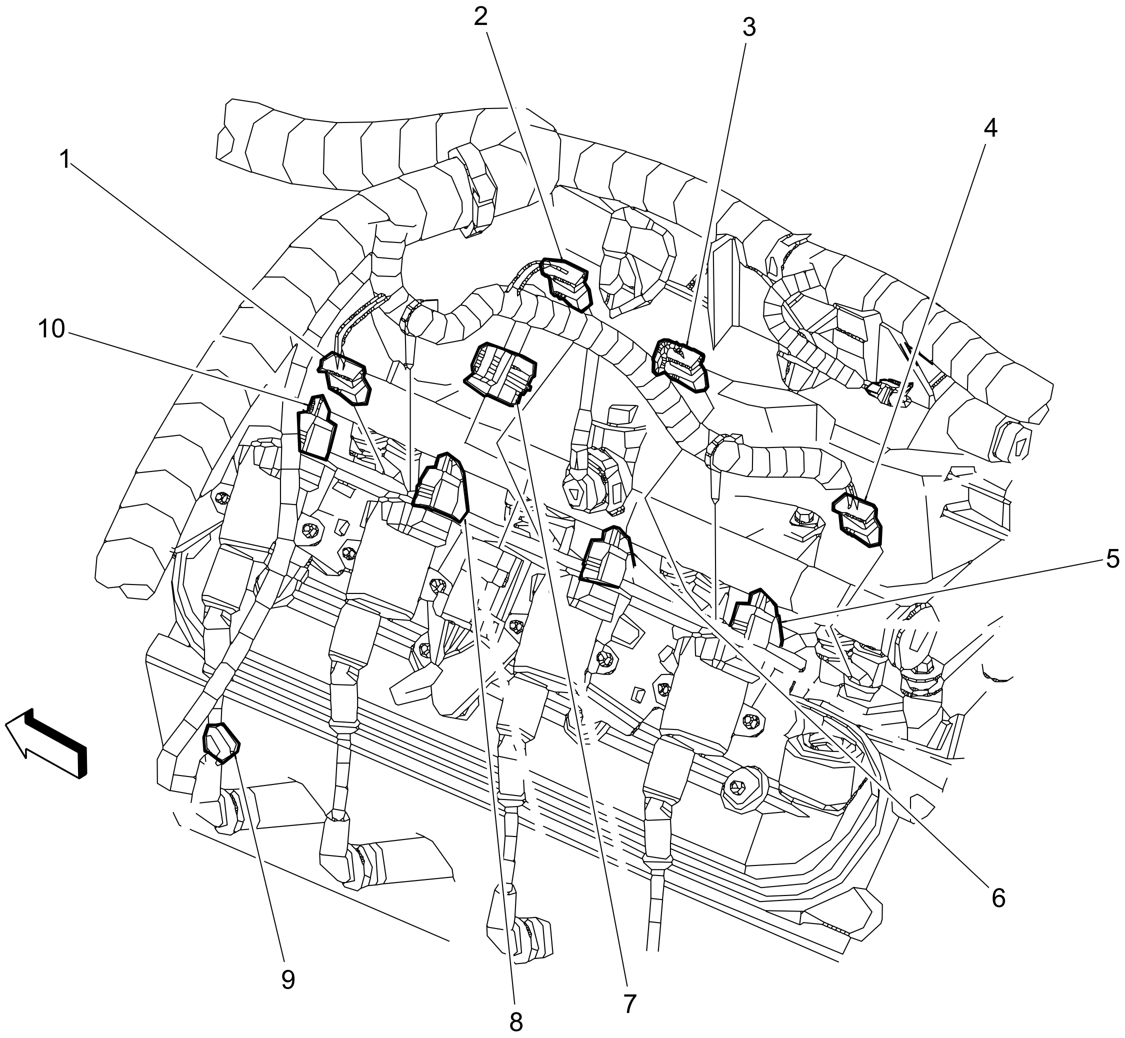
Right Front Side of the Engine Components (2 of 2, L20, L96, or LC8)



Items

1. B26 Crankshaft Position Sensor
2. Q2 A/C Compressor Clutch
3. M64 Starter Motor

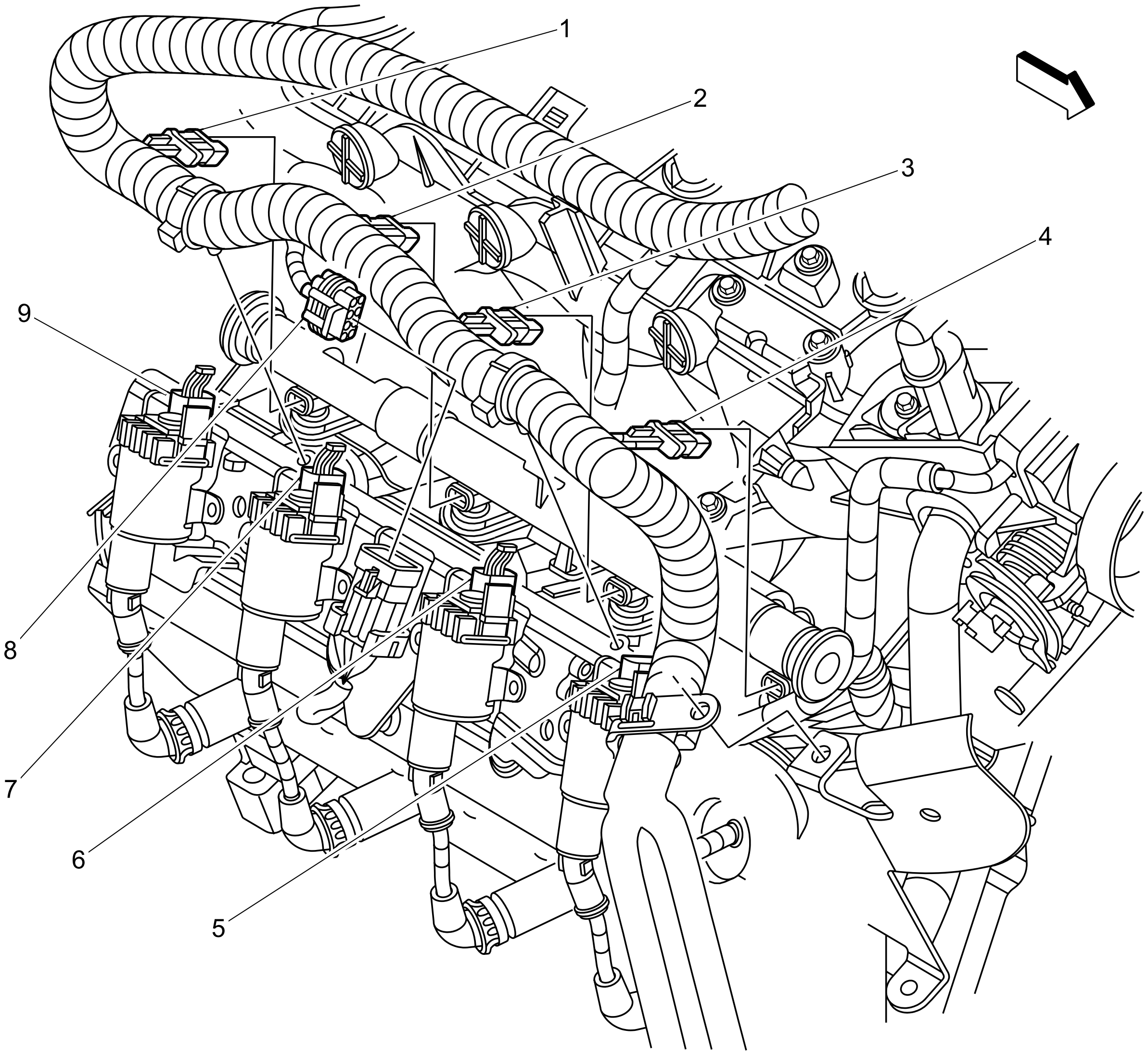
Upper Left Side of the Engine Components (L20, L96, or LC8)



Items

1. Q17A Fuel Injector 1
2. Q17C Fuel Injector 3
3. Q17E Fuel Injector 5
4. Q17G Fuel Injector 7
5. T8G Ignition Coil 7
6. T8E Ignition Coil 5
7. X126
8. T8C Ignition Coil 3
9. B34 Engine Coolant Temperature Sensor
10. T8A Ignition Coil 1

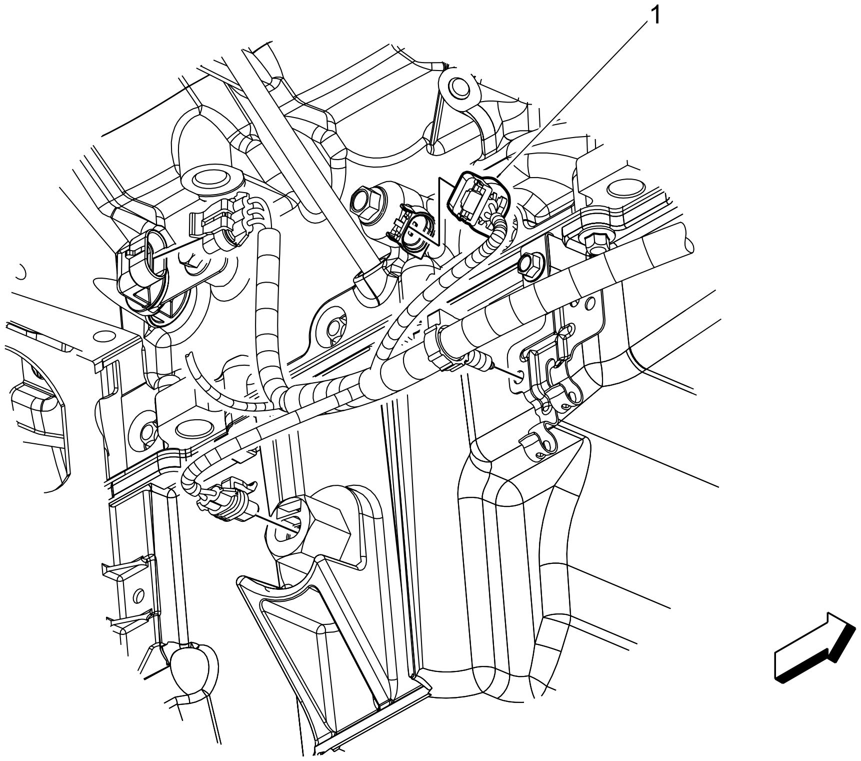
Upper Right Side of the Engine Components (L20, L96, or LC8)



Items

1. Q17H Fuel Injector 8
2. Q17F Fuel Injector 6
3. Q17D Fuel Injector 4
4. Q17B Fuel Injector 2
5. T8B Ignition Coil 2
6. T8D Ignition Coil 4
7. T8F Ignition Coil 6
8. X127
9. T8H Ignition Coil 8

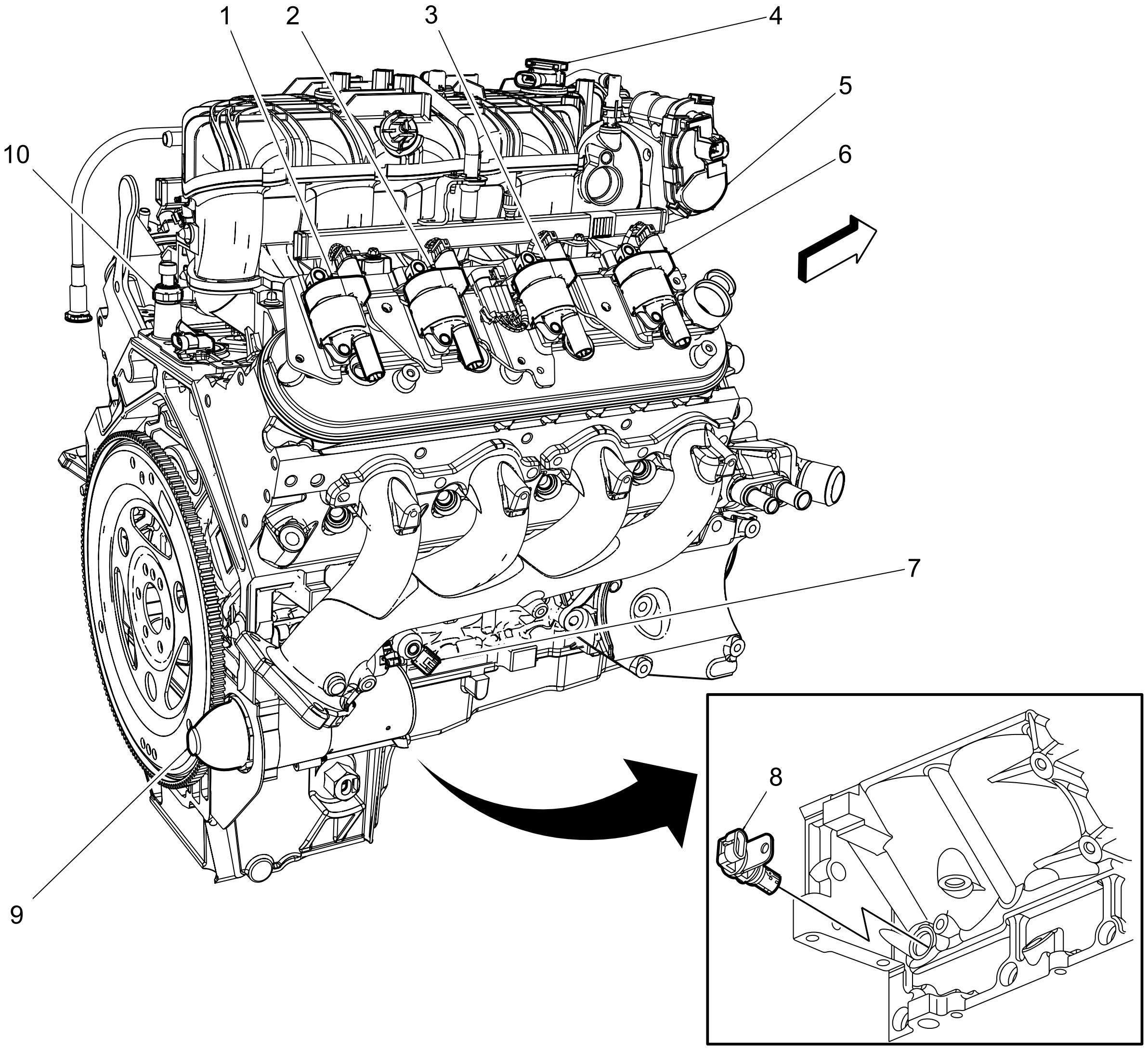
Lower Right Side of the Engine Components (L20, L96, or LC8)



Items

1. B68A Knock Sensor 1

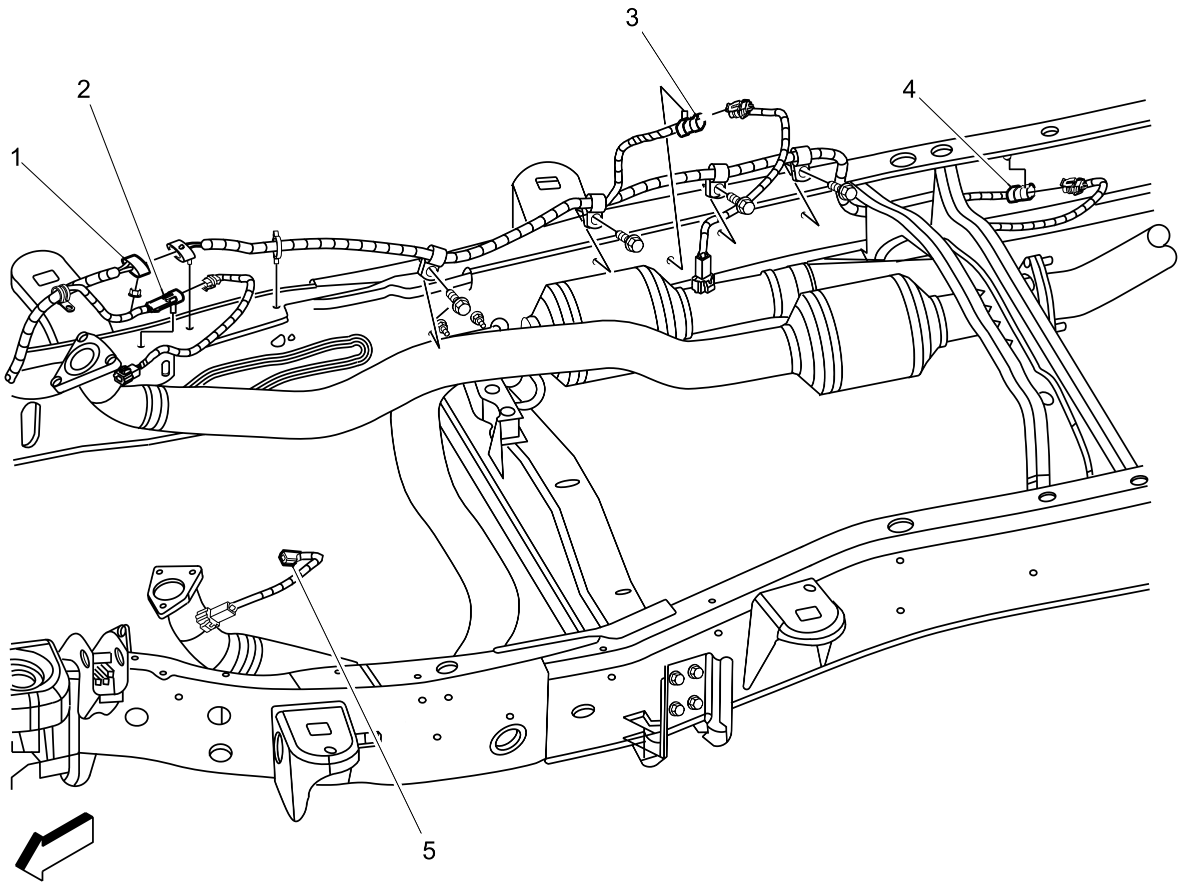
Right Front Side of the Engine Components (1 of 2, L20, L96, or LC8)



Items

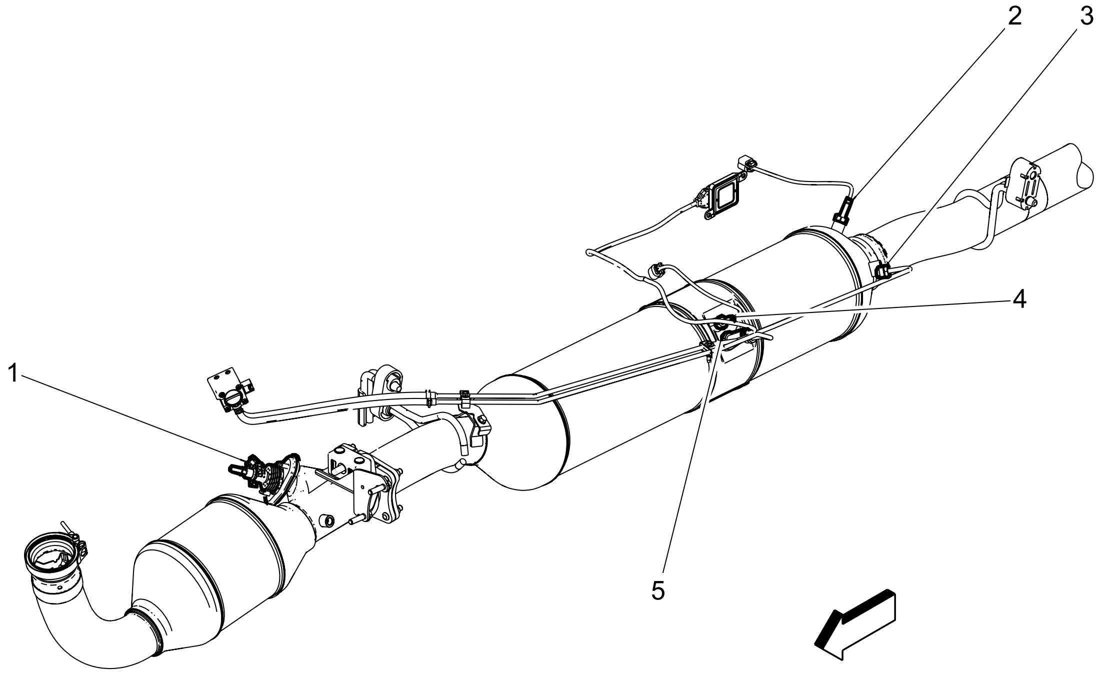
1. T8H Ignition Coil 8
2. T8F Ignition Coil 6
3. T8D Ignition Coil 4
4. B74 Manifold Absolute Pressure Sensor
5. Q38 Throttle Body
6. T8B Ignition Coil 2
7. B68A Knock Sensor 1
8. B26 Crankshaft Position Sensor
9. M64 Starter Motor
10. B37B Engine Oil Pressure Sensor

Exhaust Components (L20, L96, or LC8)



Items

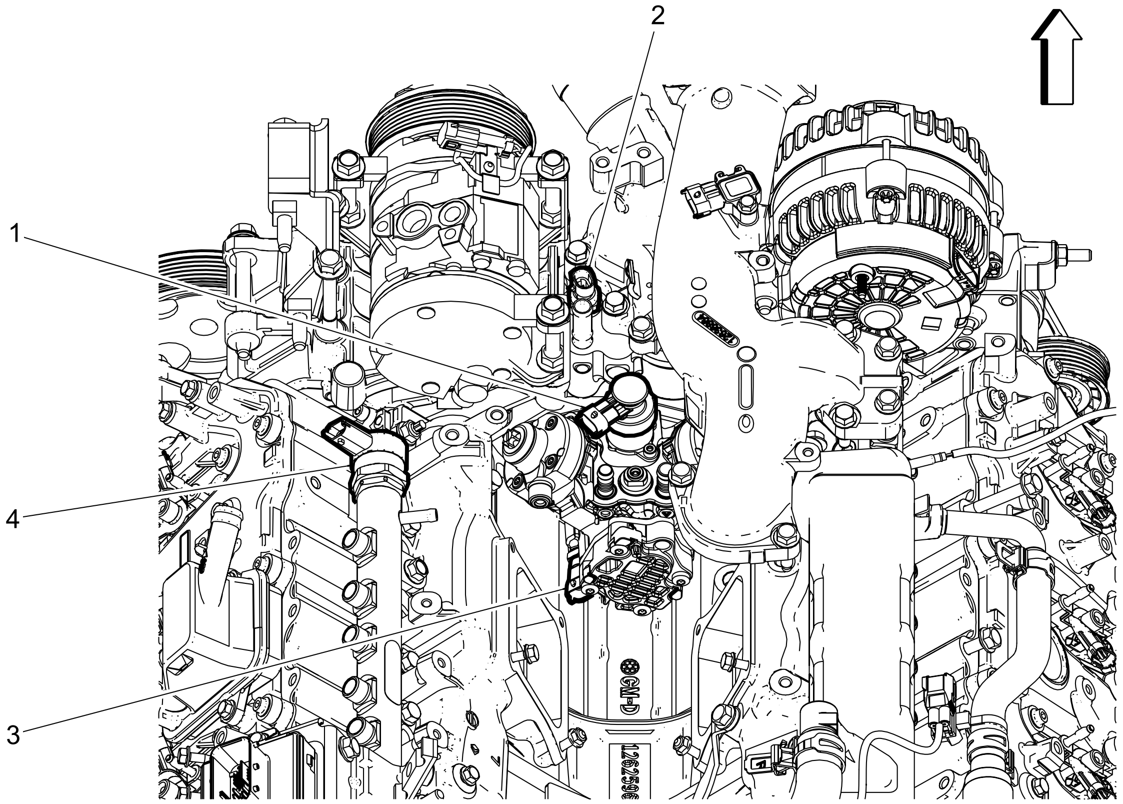
1. X128
2. B52E Heated Oxygen Sensor - Bank 2 Sensor 1
3. B52D Heated Oxygen Sensor - Bank 1 Sensor 2
4. B52F Heated Oxygen Sensor - Bank 2 Sensor 2
5. B52C Heated Oxygen Sensor - Bank 1 Sensor 1



Items

1. Q61 Reductant Injector
2. B131D Exhaust Temperature Sensor 4
3. B259 Exhaust Pressure Sensor
4. B131C Exhaust Temperature Sensor 3
5. B195B Nitrogen Oxides Sensor 2

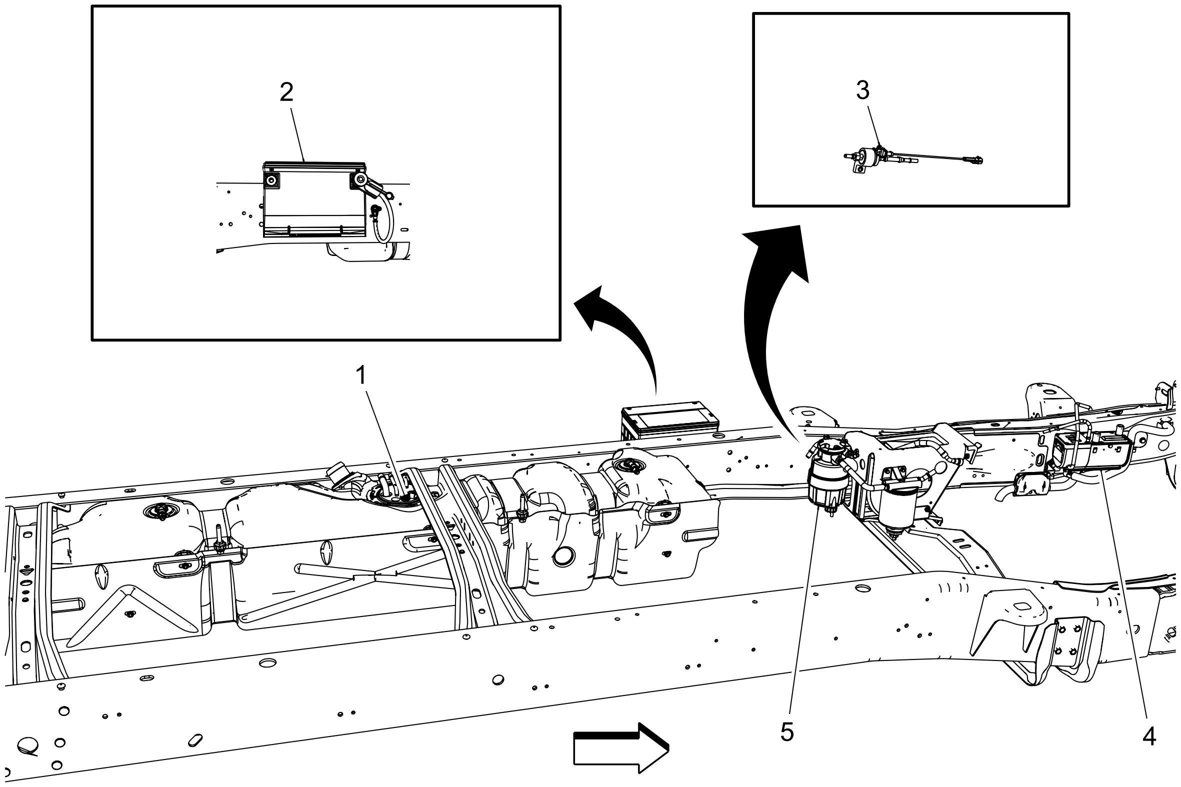
Top of the Engine Compoents (2 of 3, LGH)



Items

1. Q18A Fuel Pressure Regulator 1
2. B34 Engine Coolant Temperature Sensor
3. B48A Fuel Temperature Sensor 1
4. Q18B Fuel Pressure Regulator 2

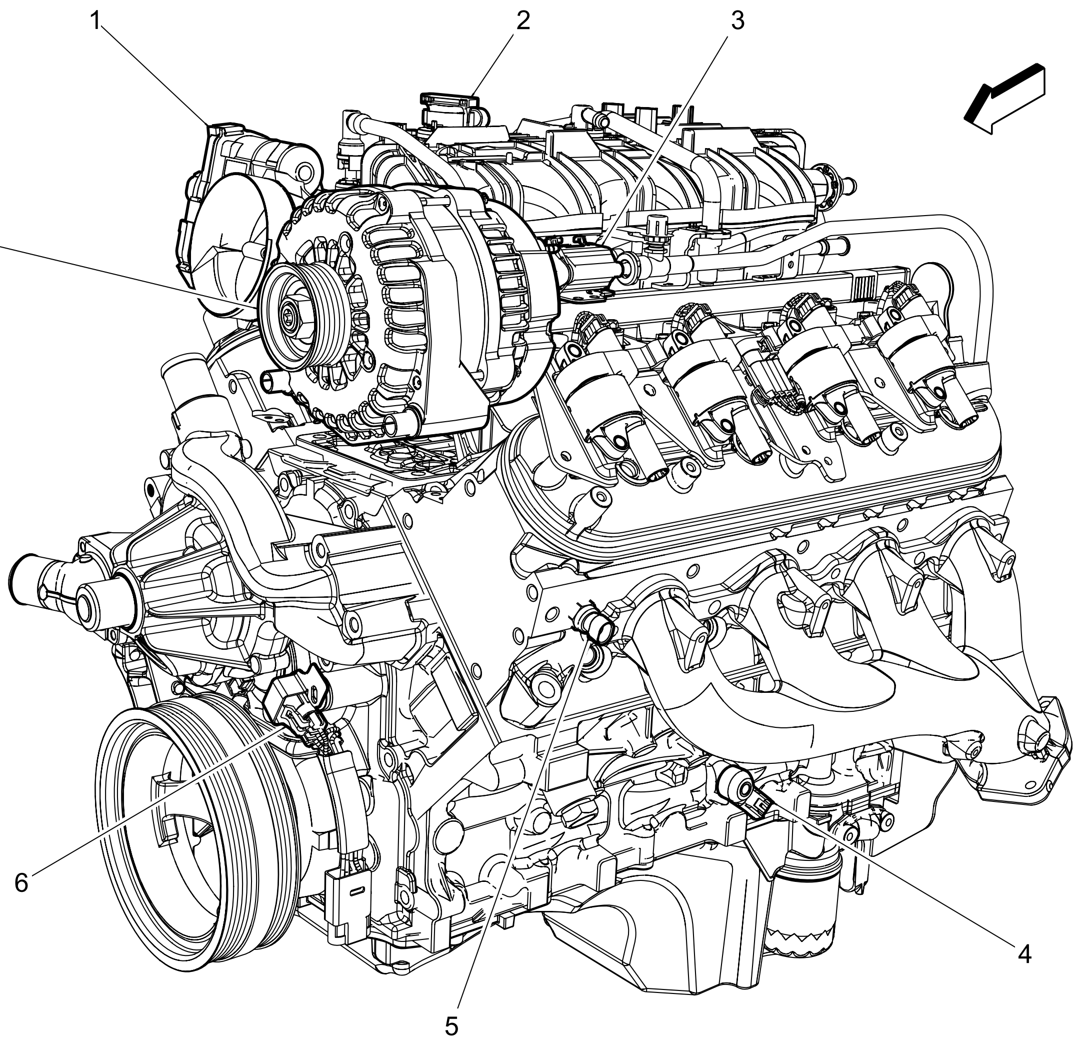
Undercar Components (LGH)



Items

1. B46 Fuel Level Sensor
2. C1B Battery - Auxiliary
3. G7 Coolant Heater Fuel Pump
4. E19 Coolant Heater
5. G12 Fuel Pump

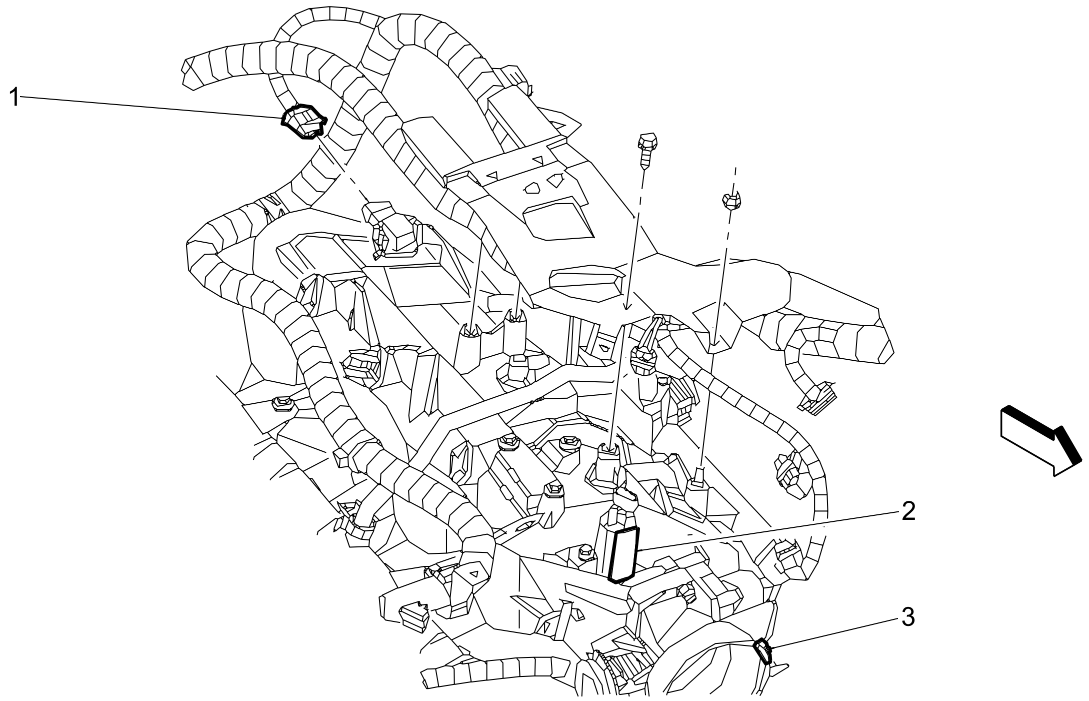
Left Front Side of the Engine Components (2 of 2, L20, L96, or LC8)



Items

1. Q38 Throttle Body
2. B74 Manifold Absolute Pressure Sensor
3. Q12 Evaporative Emission Purge Solenoid Valve
4. B68B Knock Sensor 2
5. B34 Engine Coolant Temperature Sensor
6. B23 Camshaft Position Sensor
7. G13 Generator

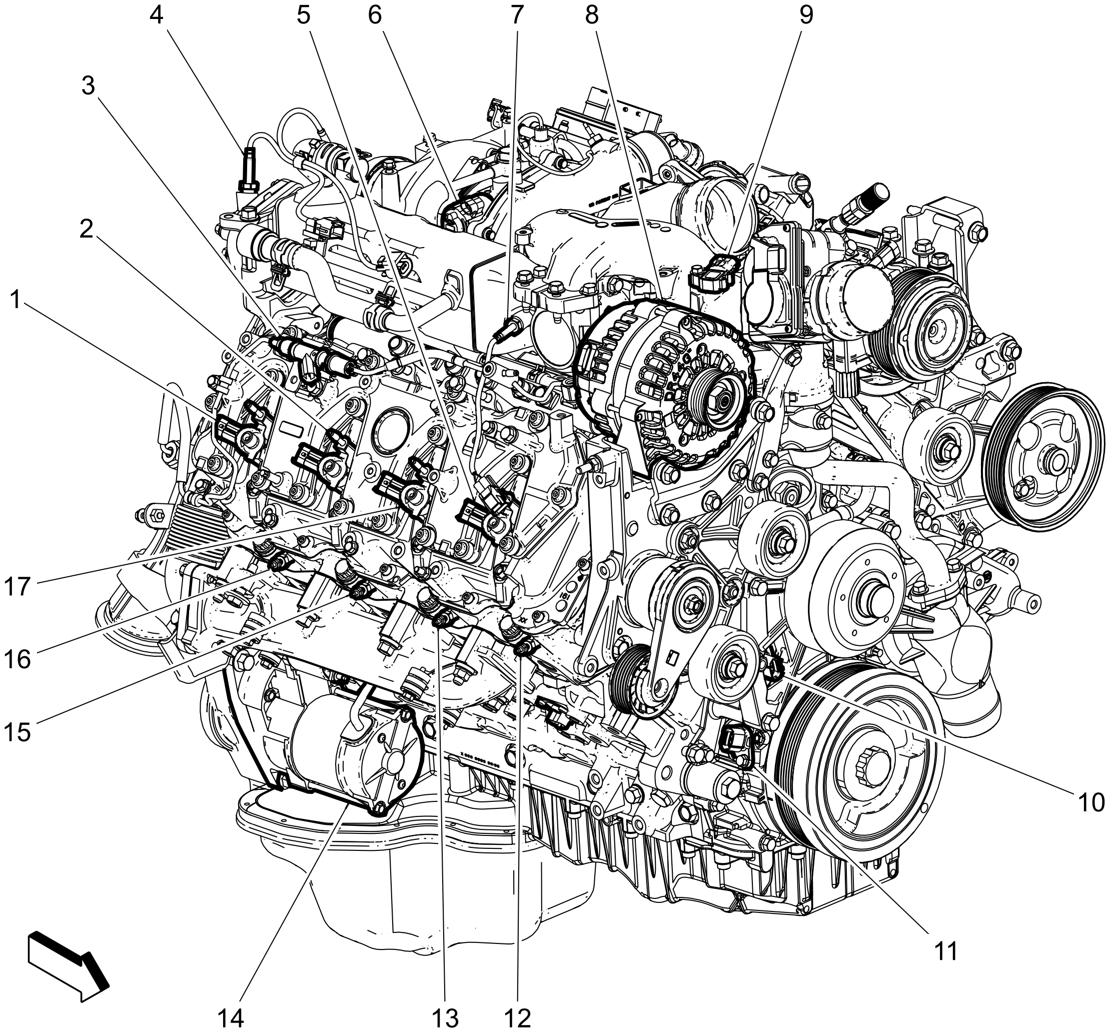
Top of the Engine Components (L20, L96, or LC8)



Items

1. B74 Manifold Absolute Pressure Sensor
2. Q12 Evaporative Emission Purge Solenoid Valve
3. Q38 Throttle Body

Right front of the Engine Components (LGH)

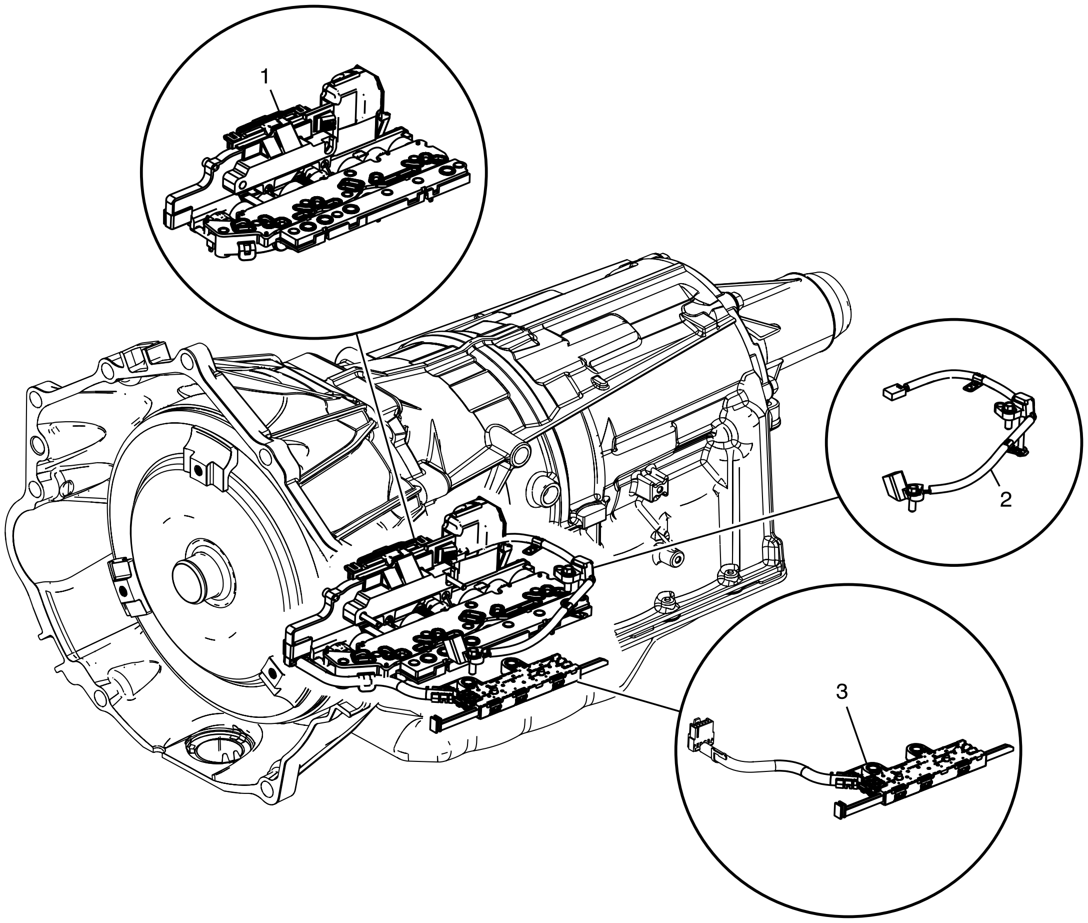


Items

1. Q17G Fuel Injector 7
2. Q17E Fuel Injector 5
3. Q67 Exhaust Aftertreatment Fuel Injector
4. B131A Exhaust Temperature Sensor 1
5. Q17A Fuel Injector 1
6. Q41 Turbocharger Vane Position Control Solenoid Valve
7. B130B Exhaust Gas Recirculation Temperature Sensor 2
8. G13 Generator
9. B74 Manifold Absolute Pressure Sensor
10. B23 Camshaft Position Sensor
11. B26 Crankshaft Position Sensor

11. B26 Crankshaft Position Sensor
12. E12A Glow Plug 1
13. E12C Glow Plug 3
14. M64 Starter Motor
15. E12E Glow Plug 5
16. E12G Glow Plug 7
17. Q17C Fuel Injector 3

Automatic Transmission Internal Electrical Components

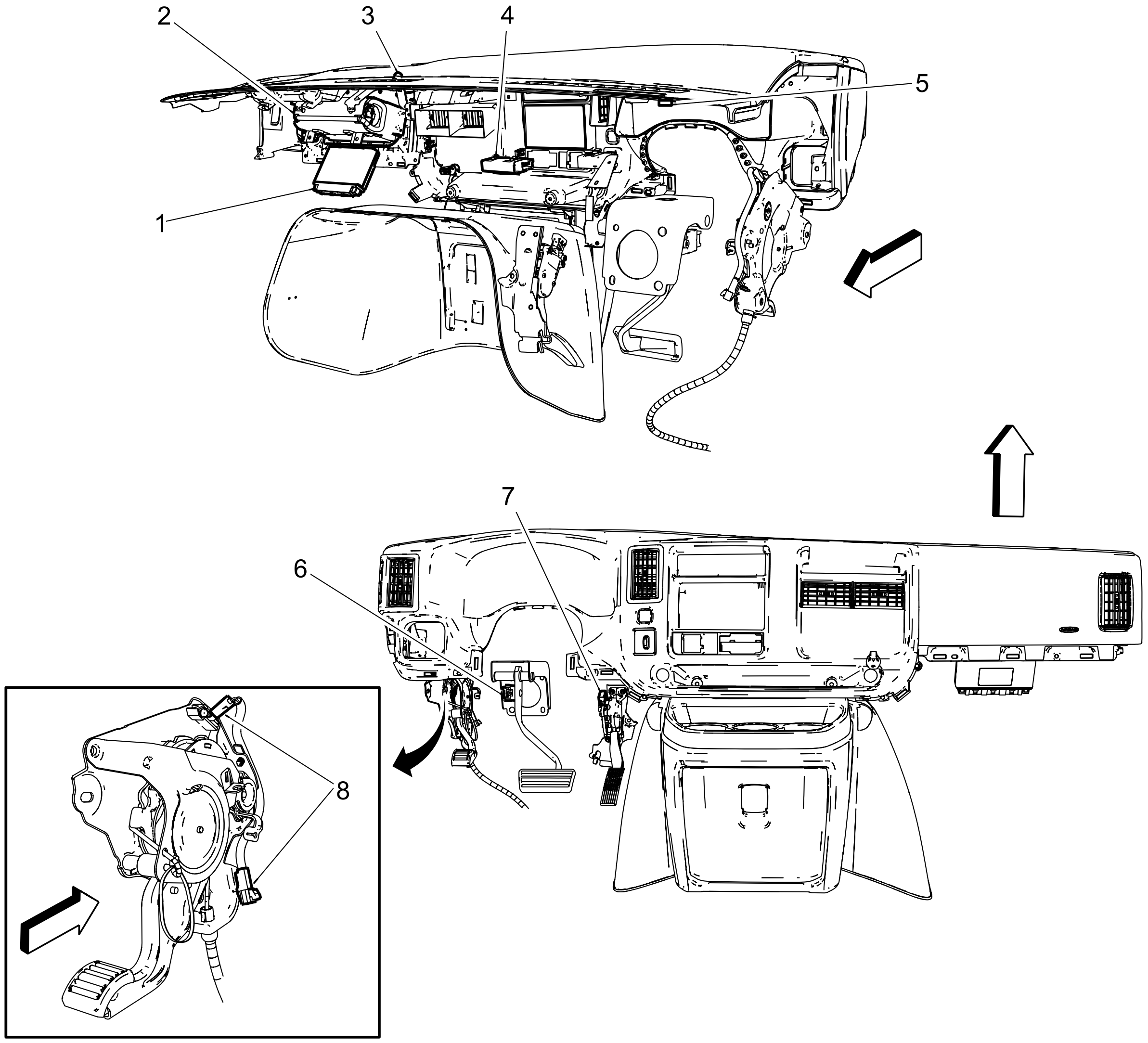


Items

1. Q8 Control Solenoid Valve Assembly
2. B14A Transmission Output Shaft Speed Sensor
3. B15 Transmission Internal Mode Switch

Instrument Panel/Center Console Component Views

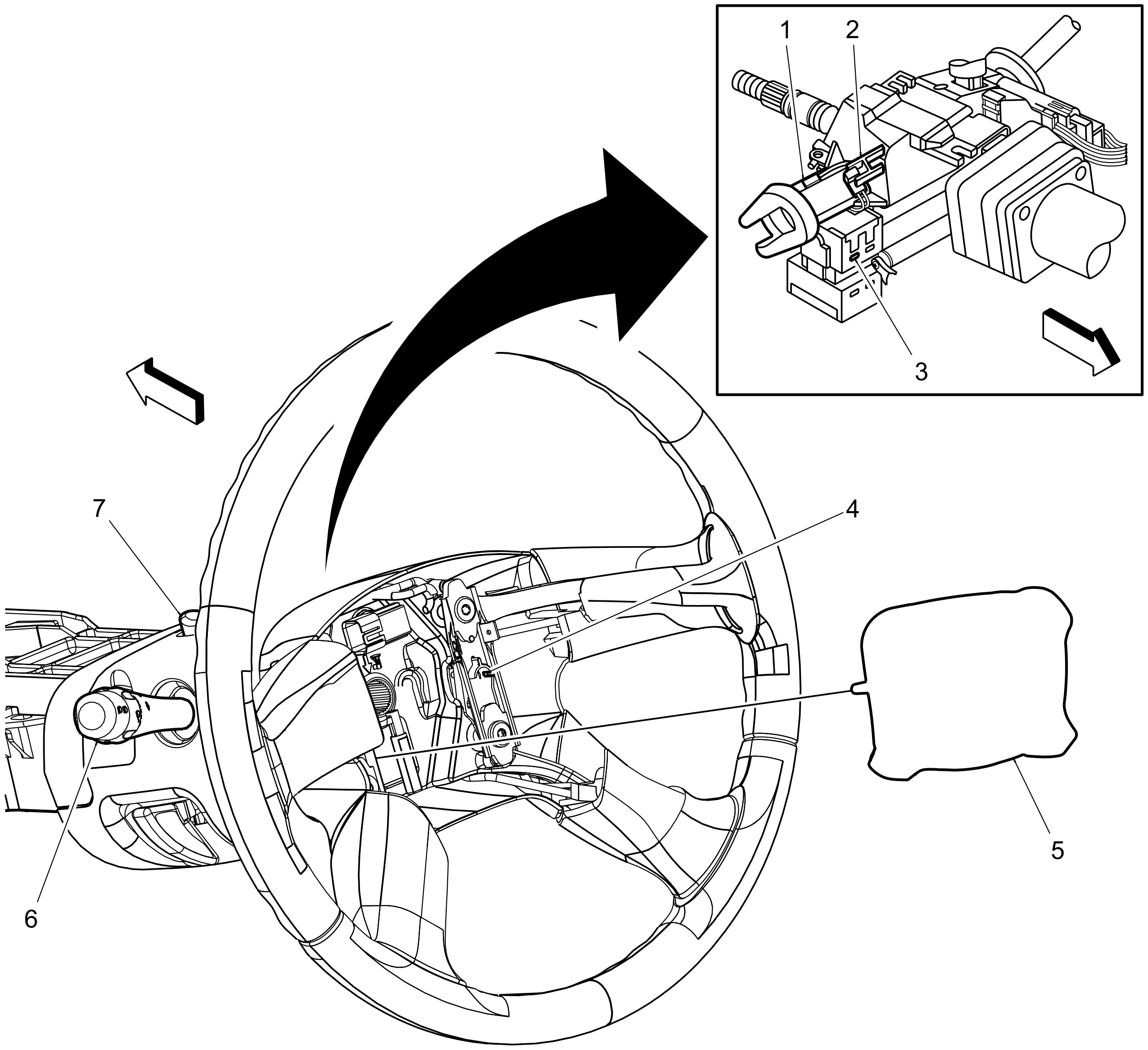
Instrument Panel Components (2 of 2)



Items

1. K9 Body Control Module
2. F101 Passenger Instrument Panel Air Bag
3. B10 Ambient Light Sensor
4. P5 Chime Alarm Control Module
5. K77 Remote Control Door Lock Receiver
6. B22 Brake Pedal Position Sensor
7. B107 Accelerator Pedal Position Sensor
8. B80 Park Brake Switch

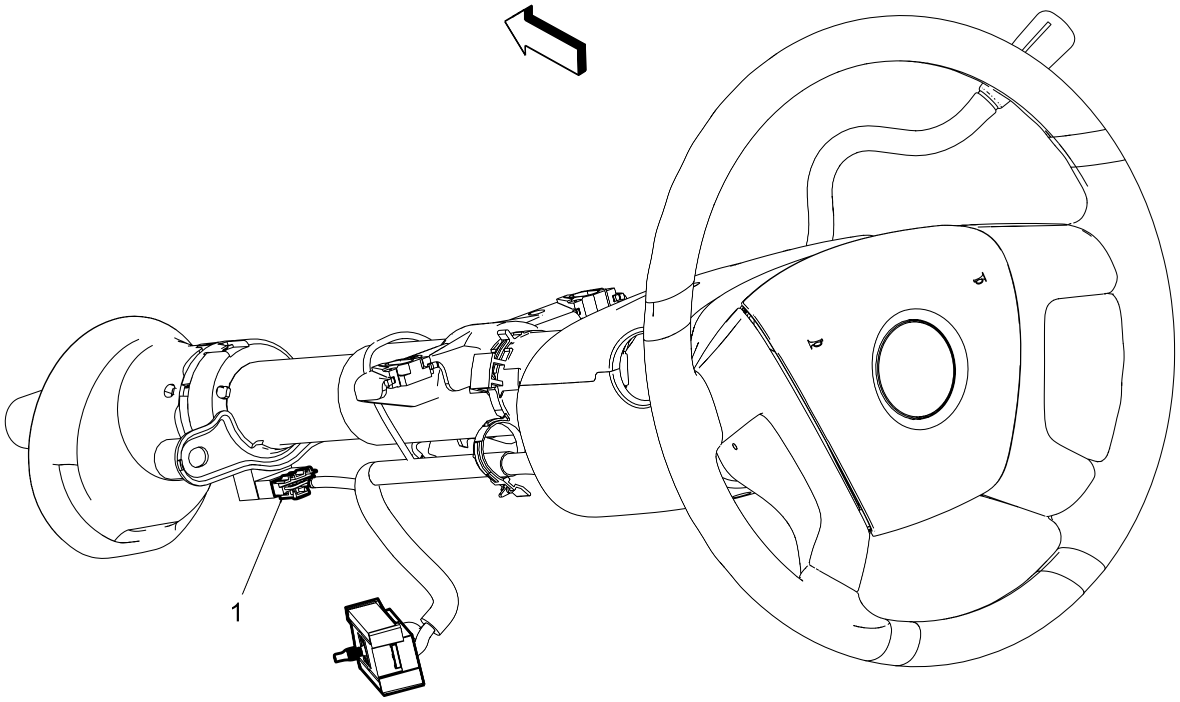
Steering Column Components (1 of 2)



Items

1. K64 Content Theft Deterrent Control Module
2. M7 Transmission Shift Lock Control Solenoid Actuator
3. S39 Ignition Switch
4. S33 Horn Switch
5. F107 Steering Wheel Air Bag
6. S78 Turn Signal/Multifunction Switch
7. S26 Hazard Warning Switch

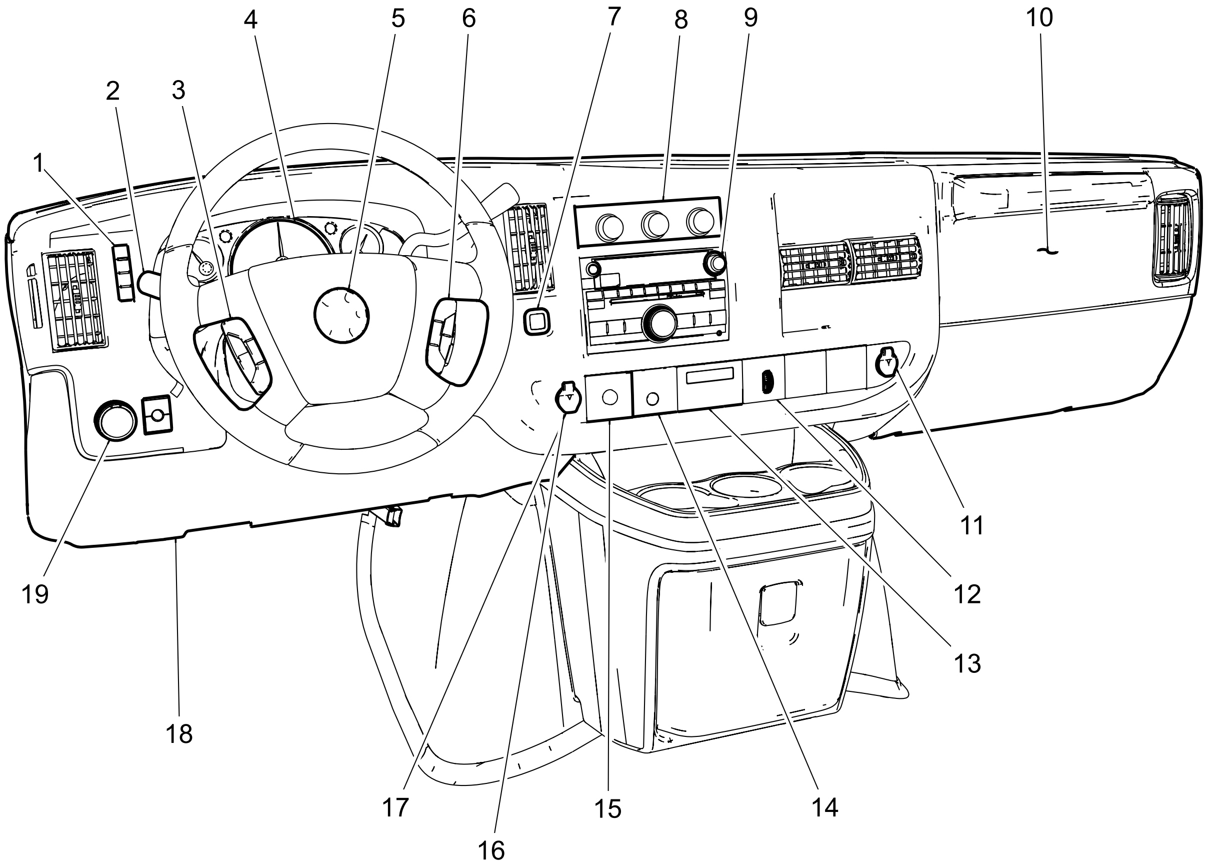
Steering Column Components (2 of 2)



Items

1. B99 Steering Wheel Angle Sensor

Instrument Panel Components (1 of 2)

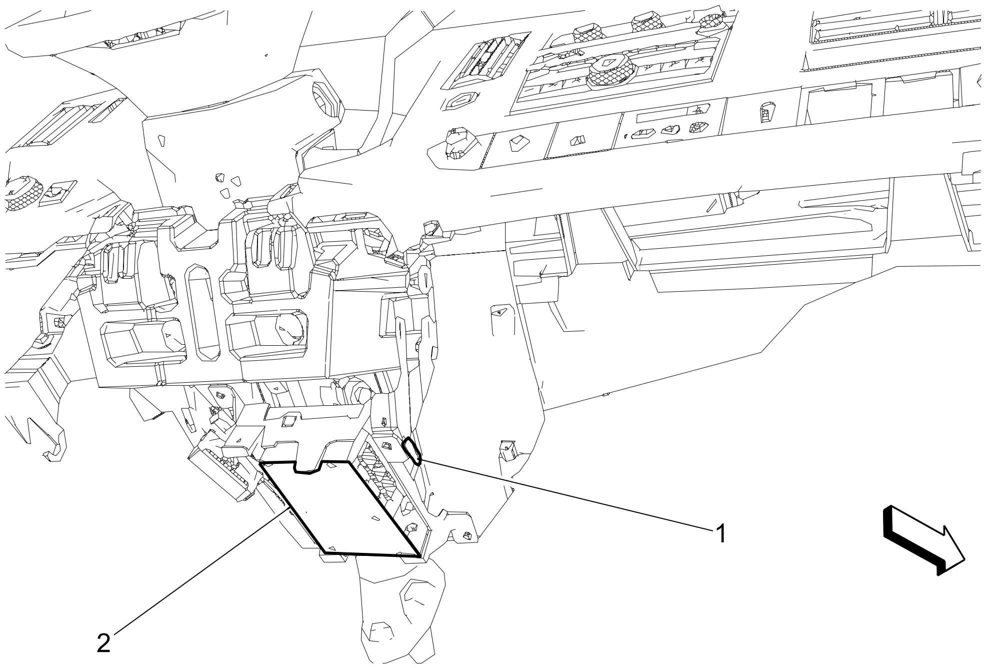


Items

1. S16 Driver Information Center Switch
2. S78 Turn Signal/Multifunction Switch
3. S70L Steering Wheel Controls Switch - Left
4. P16 Instrument Cluster
5. F107 Steering Wheel Air Bag
6. S70R Steering Wheel Controls Switch - Right
7. S74 Tow/Haul Mode Switch
8. S34 HVAC Controls Switch Assembly
9. A11 Radio
10. F101 Passenger Instrument Panel Air Bag
11. X80B Accessory Power Receptacle - Center Console 2

11. X80B Accessory Power Receptacle - Center Console 2
12. S85 Auxiliary Blower Motor Switch
13. P14 Passenger Air Bag Disabled Indicator
14. S40 Passenger Air Bag Disable Switch
15. S75 Traction Control Switch
16. X80A Accessory Power Receptacle - Center Console 1
17. E32 Cigarette Lighter Receptacle
18. X84 Data Link Connector
19. S30 Headlamp Switch

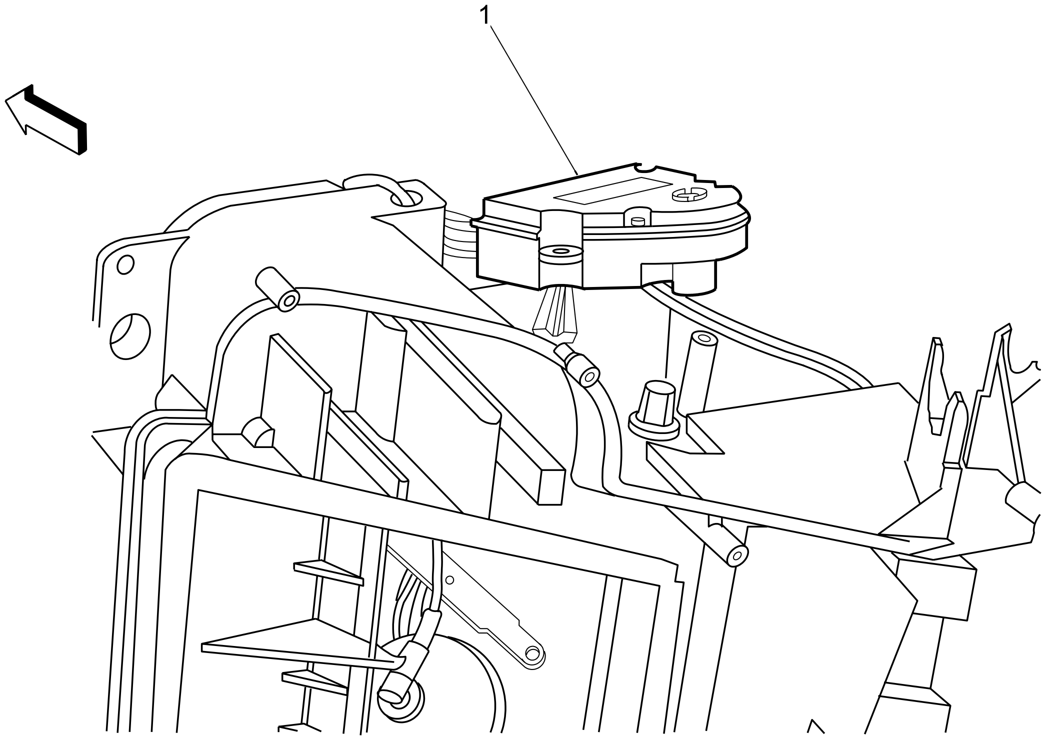
Underside of Instrument Panel Components



Items

1. A12 Digital Radio Receiver Control Module
2. K73 Telematics Communication Interface Control Module

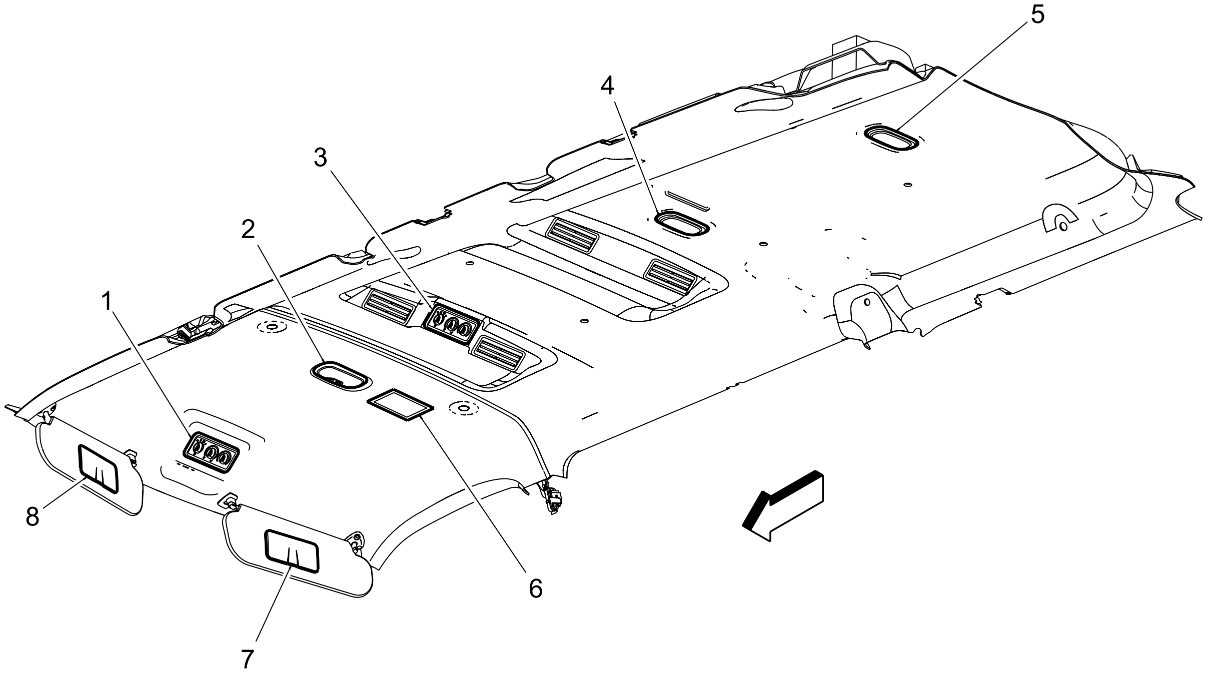
HVAC Case Components



Items

1. M6 Air Temperature Door Actuator

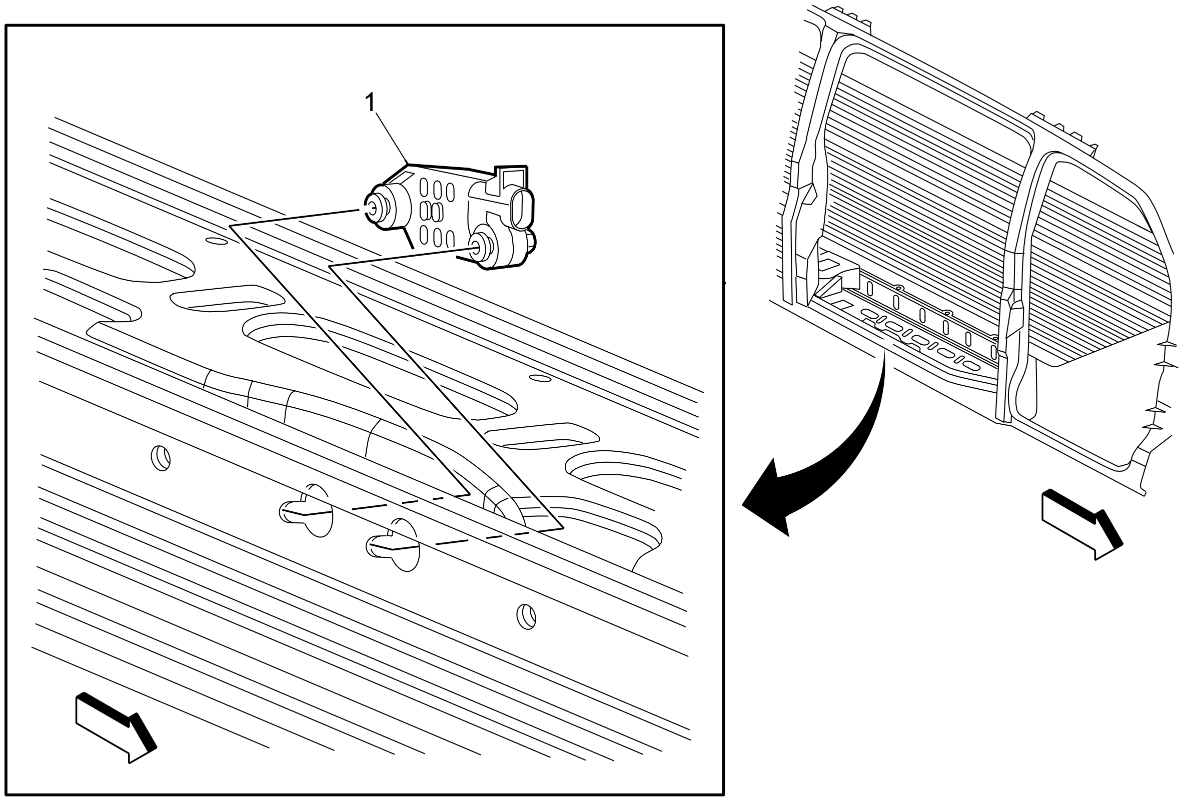
Headliner Components



Items

1. S34F HVAC Controls Switch Assembly - Auxiliary Front
2. E37F Dome/Reading Lamps - Front
3. S34R HVAC Controls Switch Assembly - Auxiliary Rear
4. E37M Dome/Reading Lamps - Middle
5. E37R Dome/Reading Lamps - Rear
6. K18 Compass Module
7. E31R Sunshade Mirror Lamp - Right
8. E31L Sunshade Mirror Lamp - Left

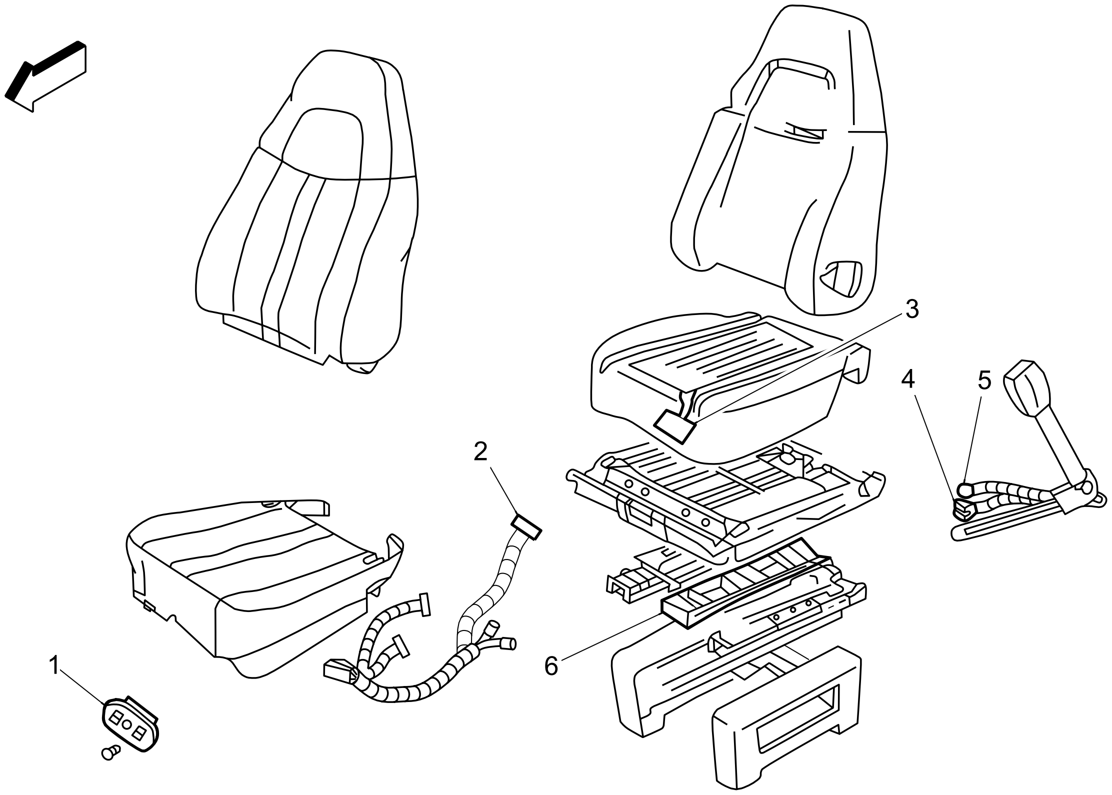
Right Rear Frame Rail Components (Passenger with YA2)



Items

1. B63RR Side Impact Sensor - Right Rear

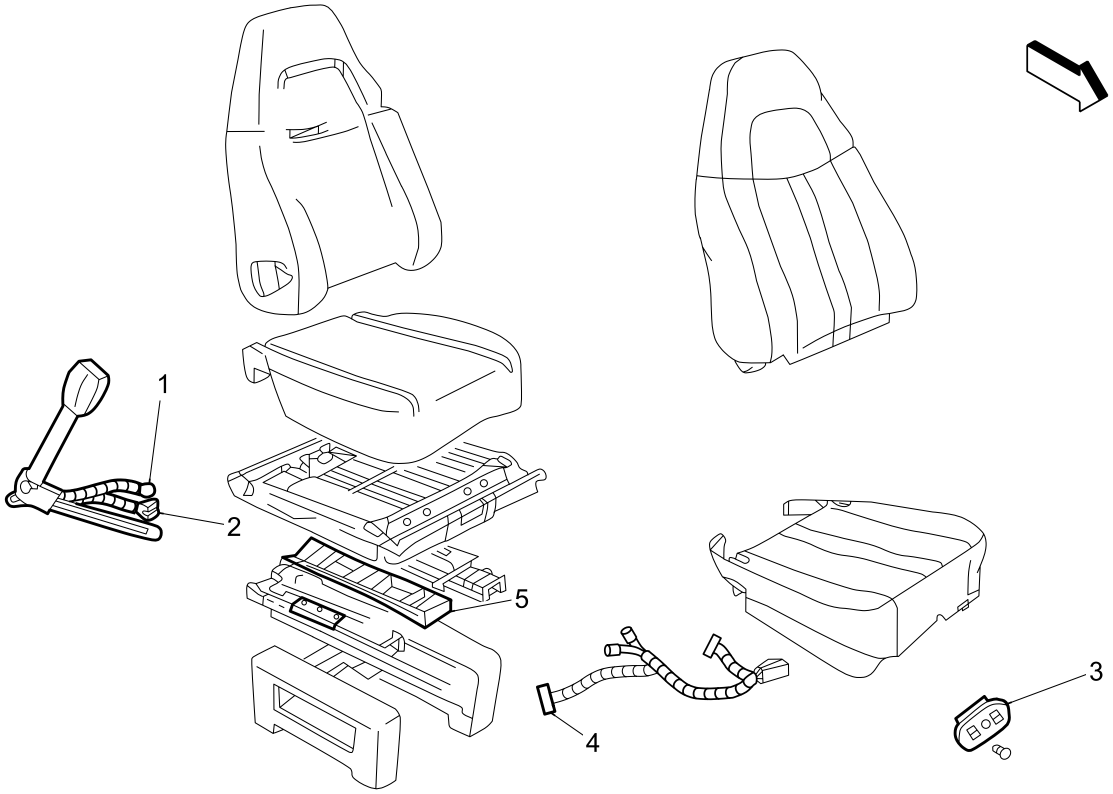
Passenger Seat Components



Items

1. S64P Seat Adjuster Switch - Passenger
2. X306
3. B60 Passenger Presence Sensor
4. F109P Seat Belt Buckle Pretensioner - Passenger
5. B153P Seat Belt Buckle - Passenger
6. M49P Seat Motor Assembly - Passenger

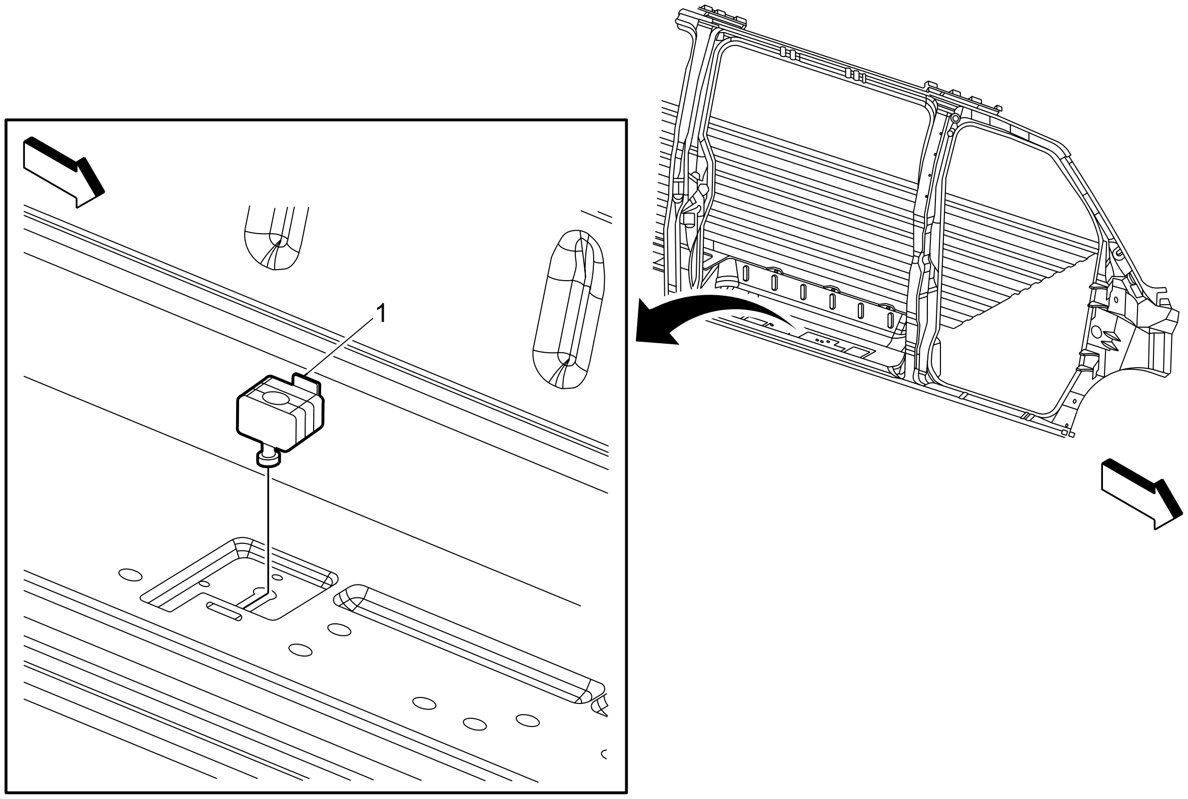
Driver Seat Components



Items

1. B153D Seat Belt Buckle - Driver
2. F109D Seat Belt Buckle Pretensioner - Driver
3. S64D Seat Adjuster Switch - Driver
4. X307
5. M49D Seat Motor Assembly - Driver

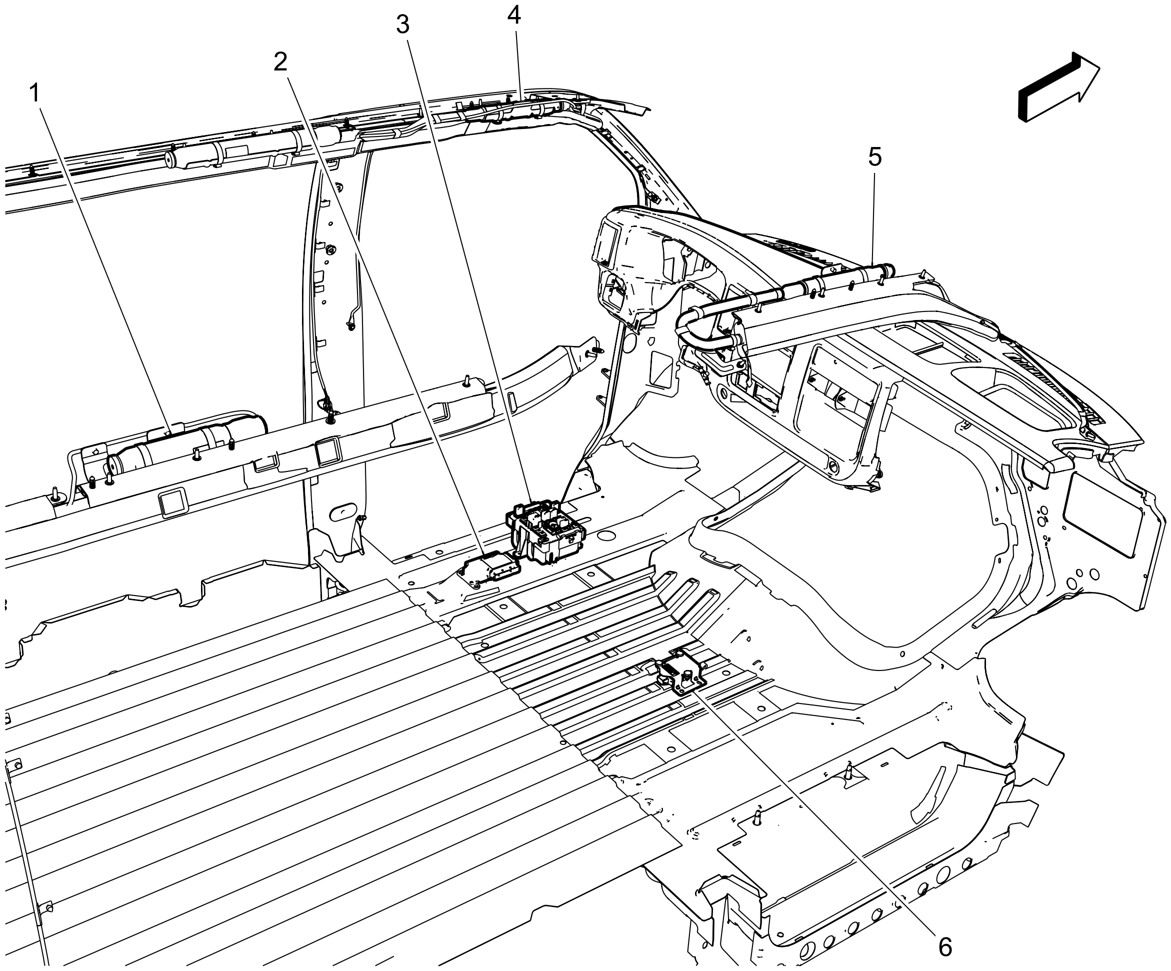
Right Rear Frame Rail Components (Passenger with E24)



Items

1. B63RR Side Impact Sensor - Right Rear

Left Front of Passenger Compartment Components

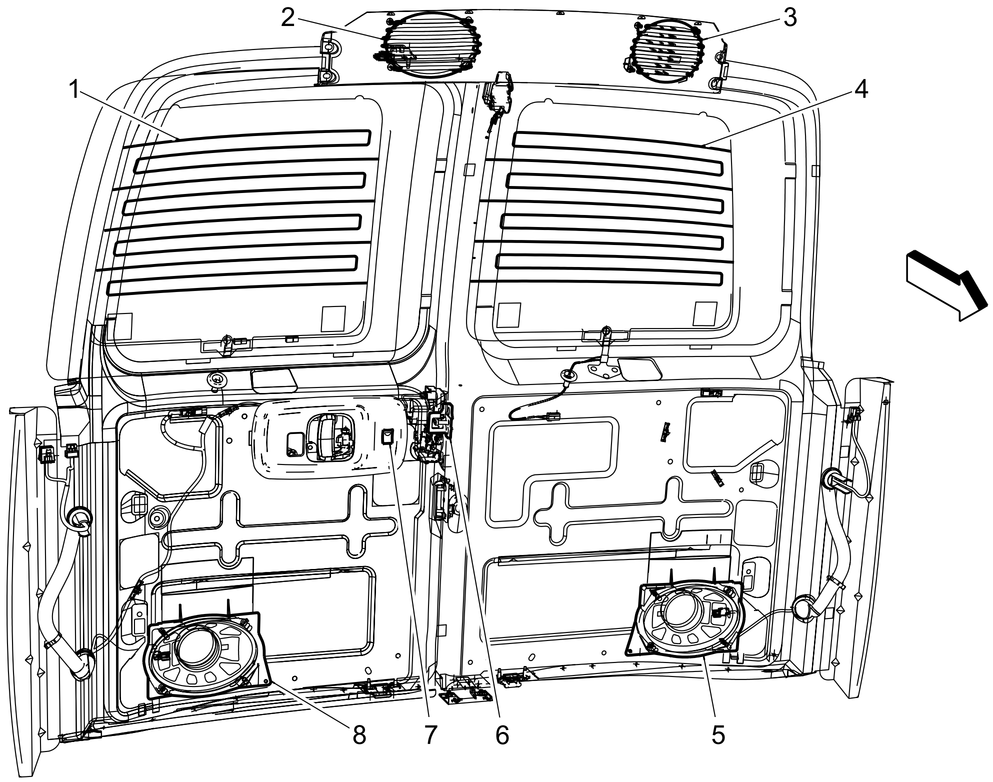


Items

1. F105RR Roof Rail Air Bag - Right Rear
2. K36 Inflatable Restraint Sensing and Diagnostic Module
3. X52A Fuse Block - Passenger Compartment
4. F105LF Roof Rail Air Bag - Left Front
5. F105RF Roof Rail Air Bag - Right Front
6. B119 Multi-axis Acceleration Sensor

Door Component Views

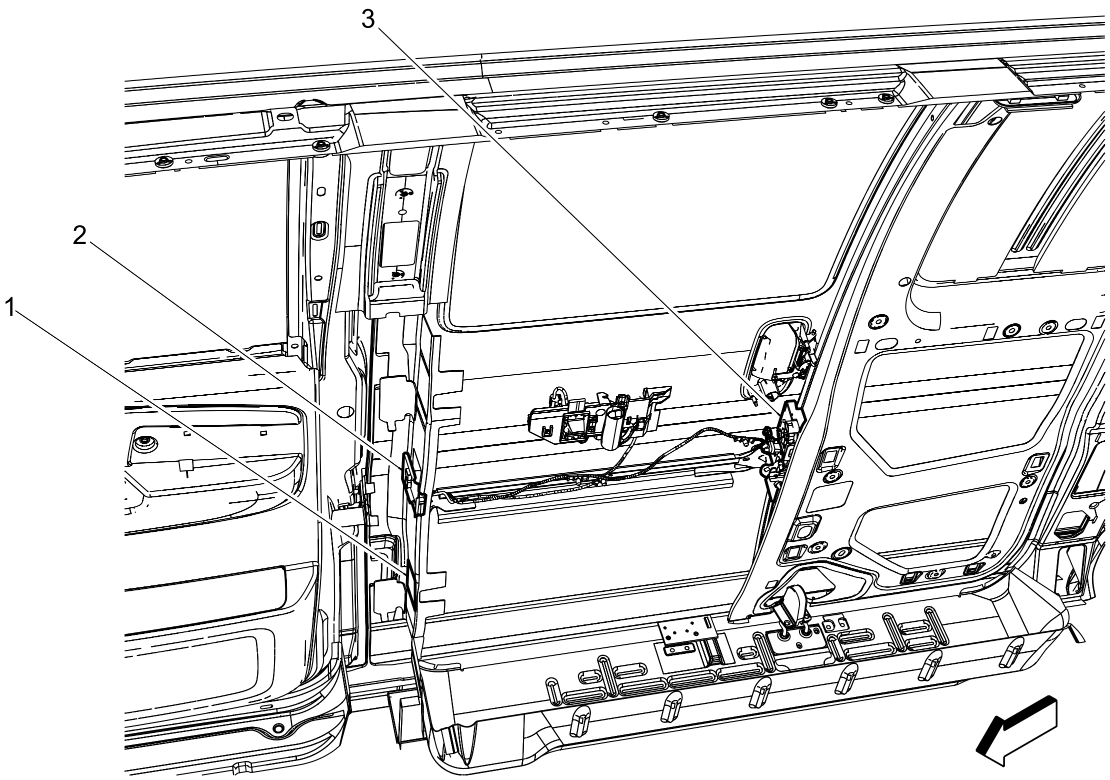
Rear Door Components (Passenger or Cargo)



Items

1. E18R Rear Defogger Grid - Right
2. P19RR Speaker - Right Rear Roof
3. P19LR Speaker - Left Rear Roof
4. E18L Rear Defogger Grid - Left
5. P19F Speaker - Left Rear Cargo Door
6. M13 Door Latch Assembly - Rear Cargo
7. S13A Door Lock Switch - Rear Cargo
8. P19T Speaker - Right Rear Cargo Door

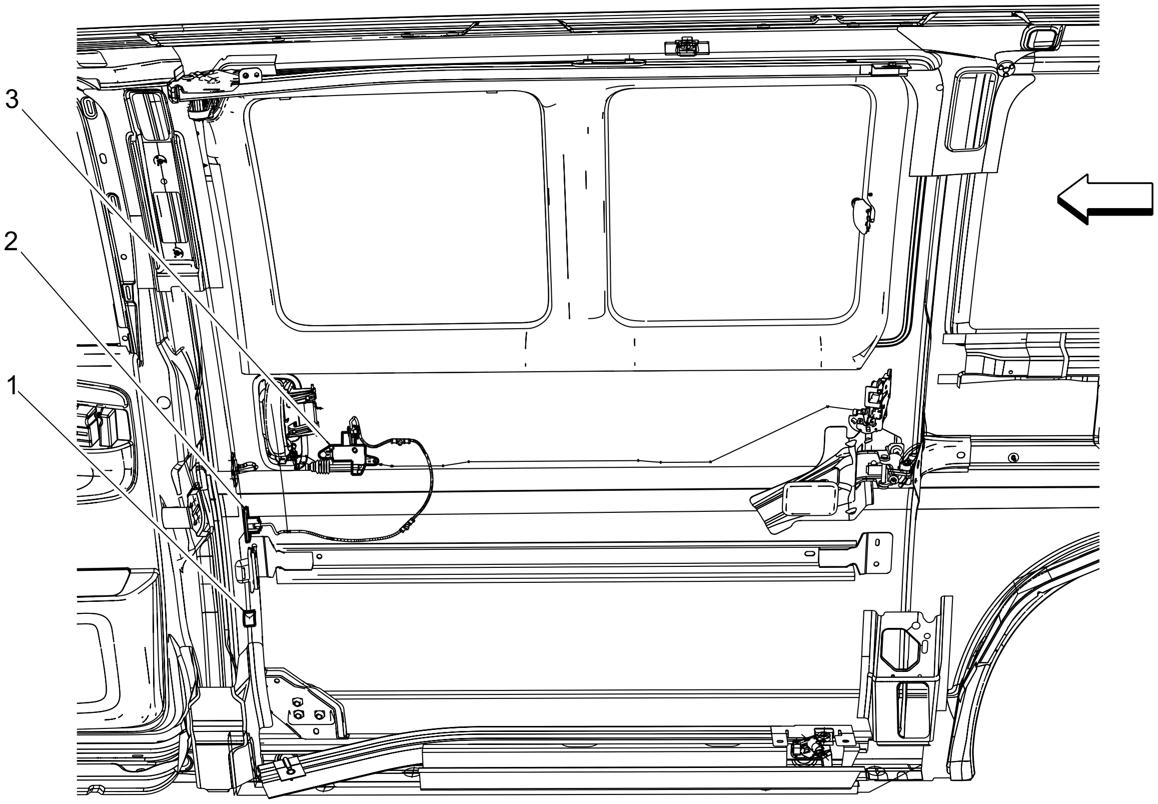
Right Side Hinged Door Components (E24)



Items

1. B28F Door Ajar Switch - Right Sliding
2. X87RB Sliding Door Jamb Contact Plate - Right Body
3. M14RR Door Lock Actuator - Right Rear

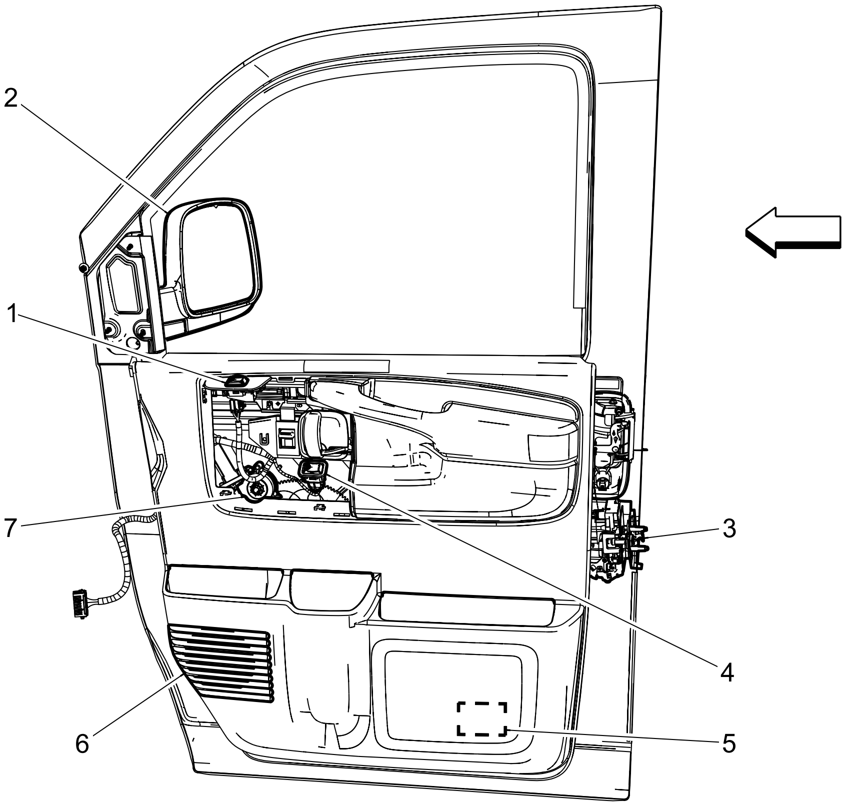
Right Sliding Door Components (YA2)



Items

1. B28F Door Ajar Switch - Right Sliding
2. X87RB Sliding Door Jamb Contact Plate - Right Body
3. M14RR Door Lock Actuator - Right Rear

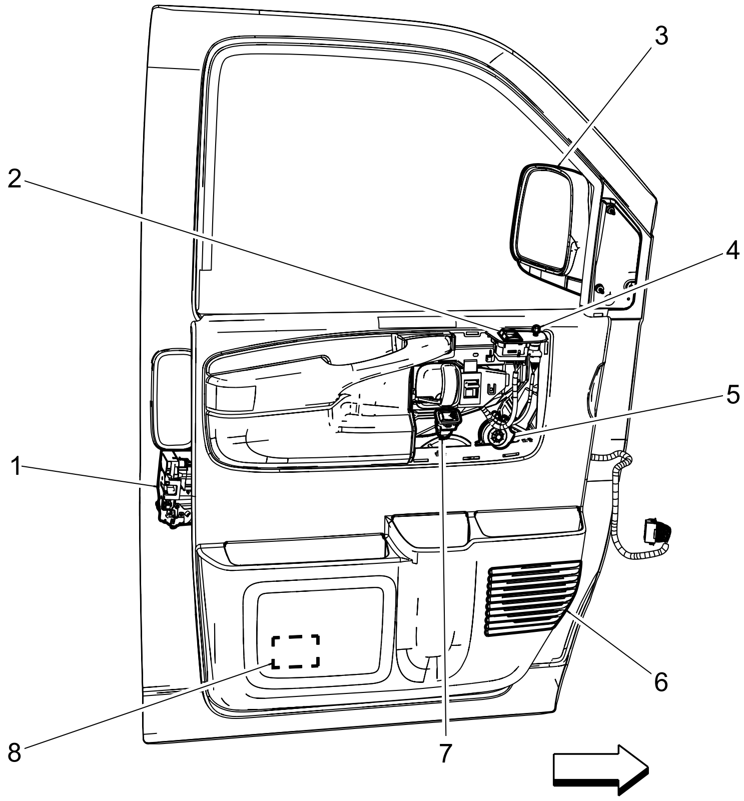
Front Passenger Door Components



Items

1. S79P Window Switch - Passenger
2. A9B Outside Rearview Mirror - Passenger
3. A23P Door Latch Assembly - Passenger
4. S13P Door Lock Switch - Passenger
5. B63RF Side Impact Sensor - Right Front
6. P19AH Speaker - Right Front Door
7. M74P Window Motor - Passenger

Driver Door Components

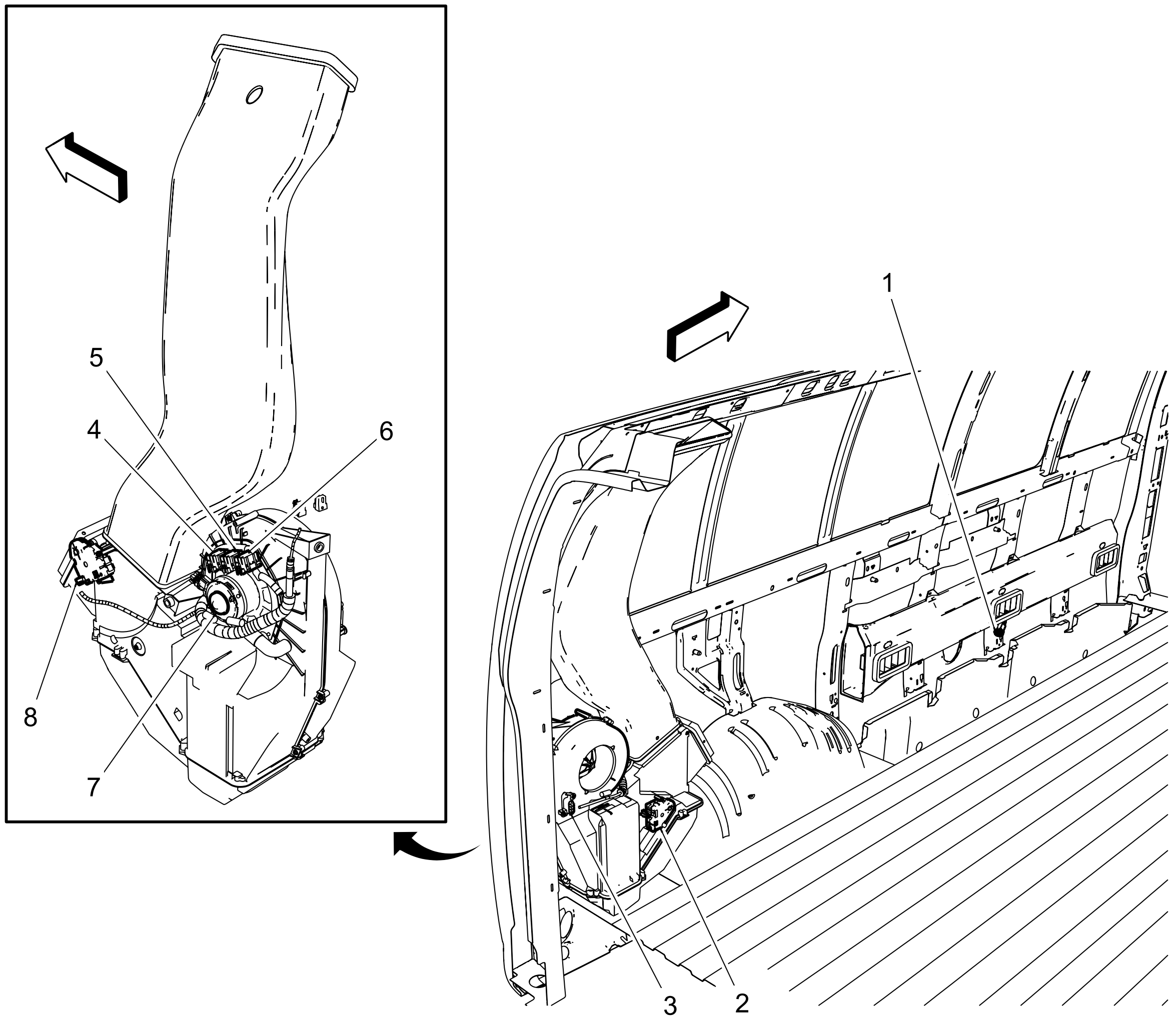


Items

1. A23D Door Latch Assembly - Driver
2. S79D Window Switch - Driver
3. A9A Outside Rearview Mirror - Driver
4. S52 Outside Rearview Mirror Switch
5. M74D Window Motor - Driver
6. P19AG Speaker - Left Front Door
7. S13D Door Lock Switch - Driver
8. B63LF Side Impact Sensor - Left Front

Luggage Compartment/Rear of Vehicle Component Views

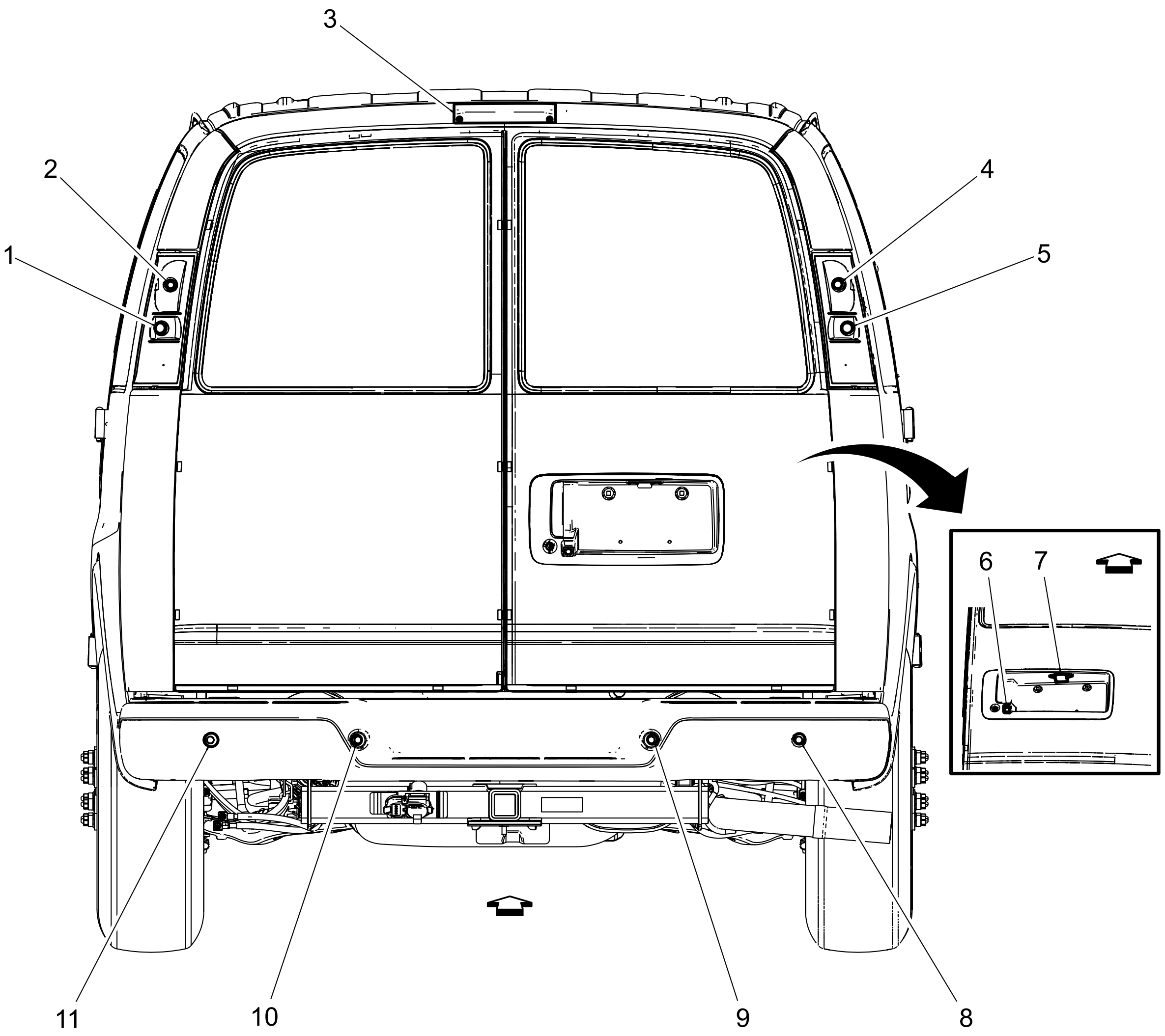
Left Rear Cargo Area Components (Passenger or Cargo)



Items

1. B63LR Side Impact Sensor - Left Rear
2. M6B Air Temperature Door Actuator - Auxiliary
3. R3B Blower Motor Resistor - Auxiliary
4. KR32B Blower Motor High Speed Relay - Auxiliary
5. KR32D Blower Motor Medium Speed Relay - Auxiliary
6. KR32C Blower Motor Low Speed Relay - Auxiliary
7. M8B Blower Motor - Auxiliary
8. M37B Mode Door Actuator - Auxiliary

Rear Exterior Lights (Passenger or Cargo)

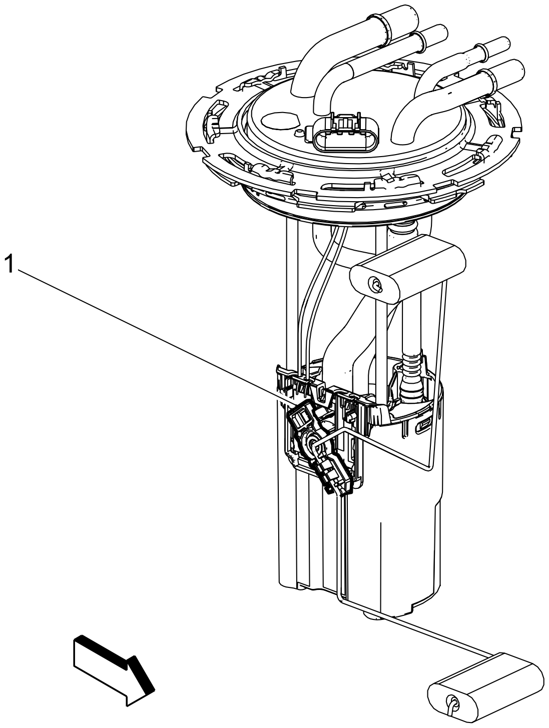


Items

1. E5A Backup Lamp - Left
2. E5S Tail/Stop and Turn Signal Lamp - Left
3. E6 Center High Mounted Stop Lamp
4. E5T Tail/Stop and Turn Signal Lamp - Right
5. E5B Backup Lamp - Right
6. B87 Rearview Camera
7. E7 License Plate Lamp
8. B78H Rear Object Sensor - Right Outer
9. B78F Rear Object Sensor - Right Middle
10. B78E Rear Object Sensor - Left Middle
11. B78G Rear Object Sensor - Left Outer

11. B78G Rear Object Sensor - Left Outer

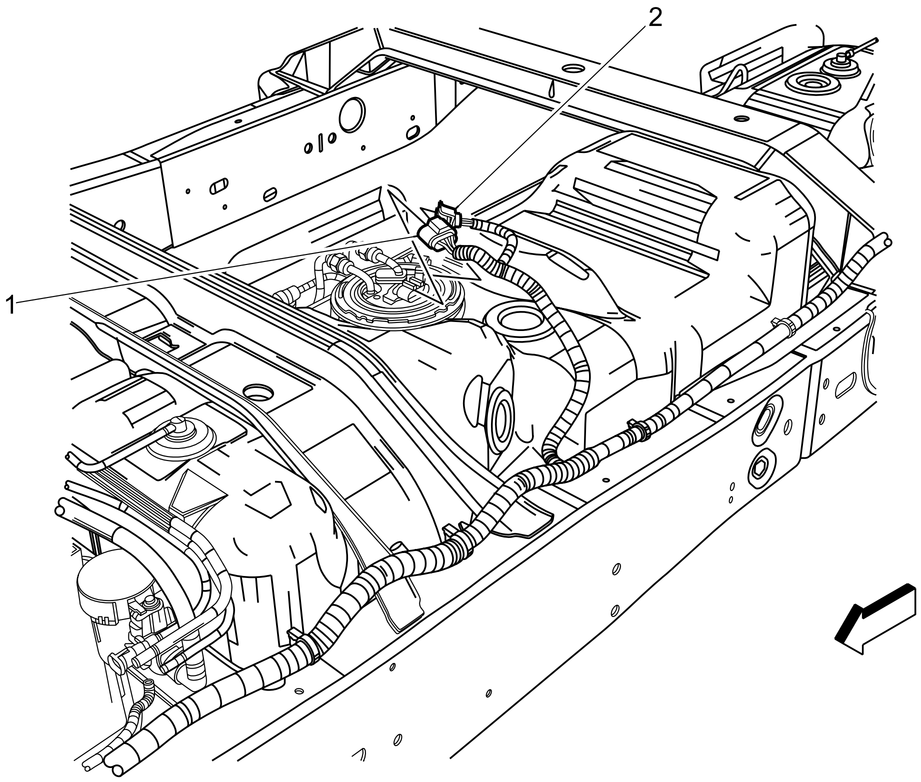
Inside of Fuel Tank Components (LGH)



Items

1. B46 Fuel Level Sensor

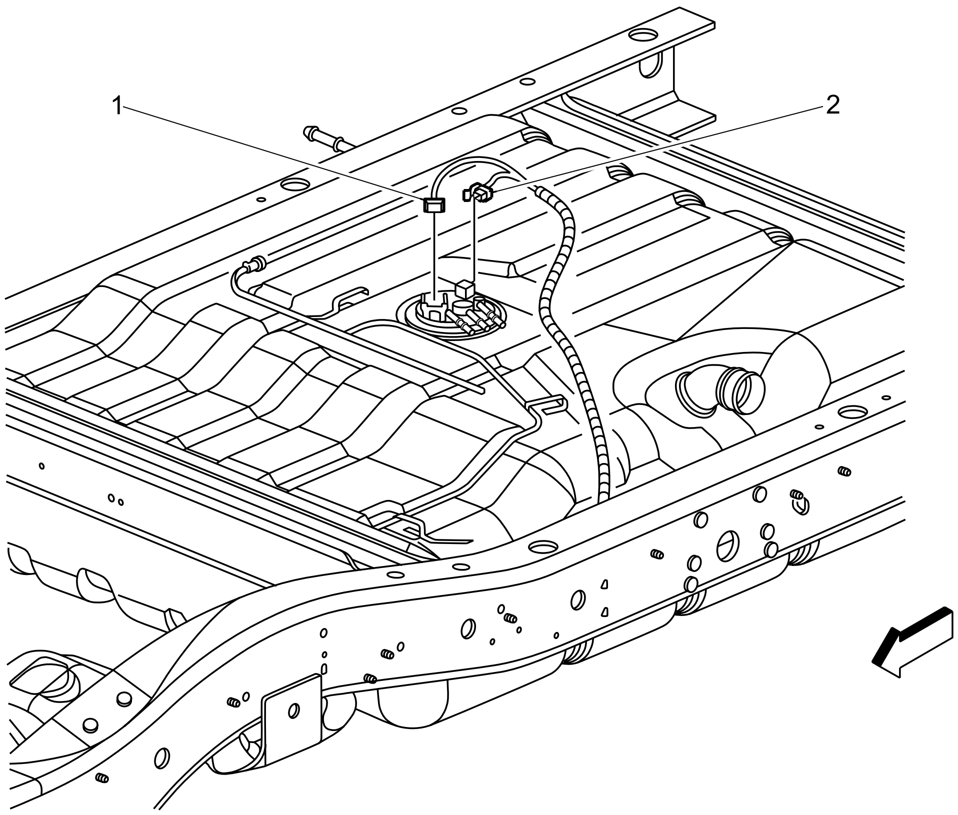
Fuel Tank Components (Without NE7)



Items

1. A7 Fuel Pump and Level Sensor Assembly
2. B150 Fuel Tank Pressure Sensor

Fuel Tank Components (NE7)

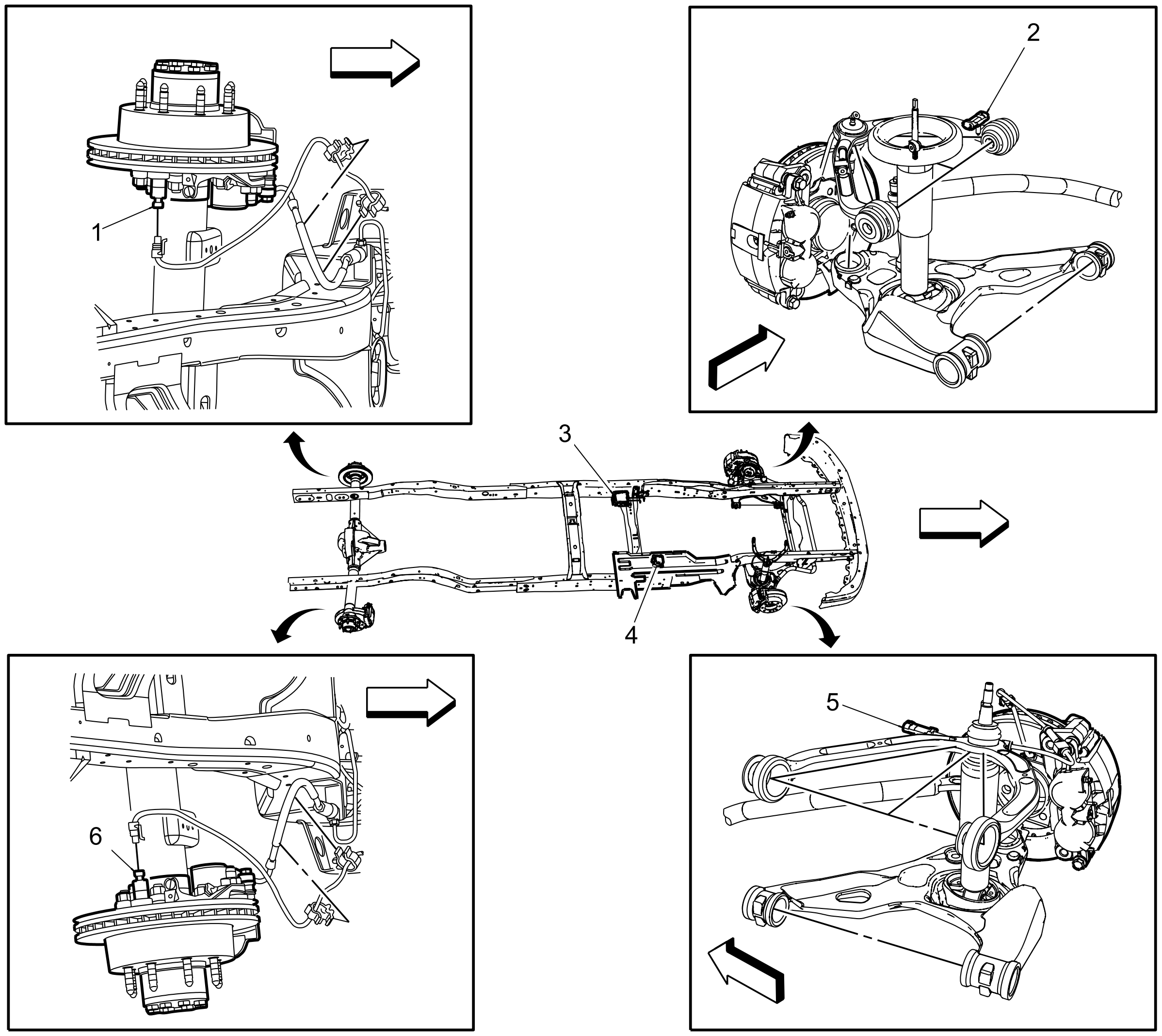


Items

1. B150 Fuel Tank Pressure Sensor

2. A7 Fuel Pump and Level Sensor Assembly

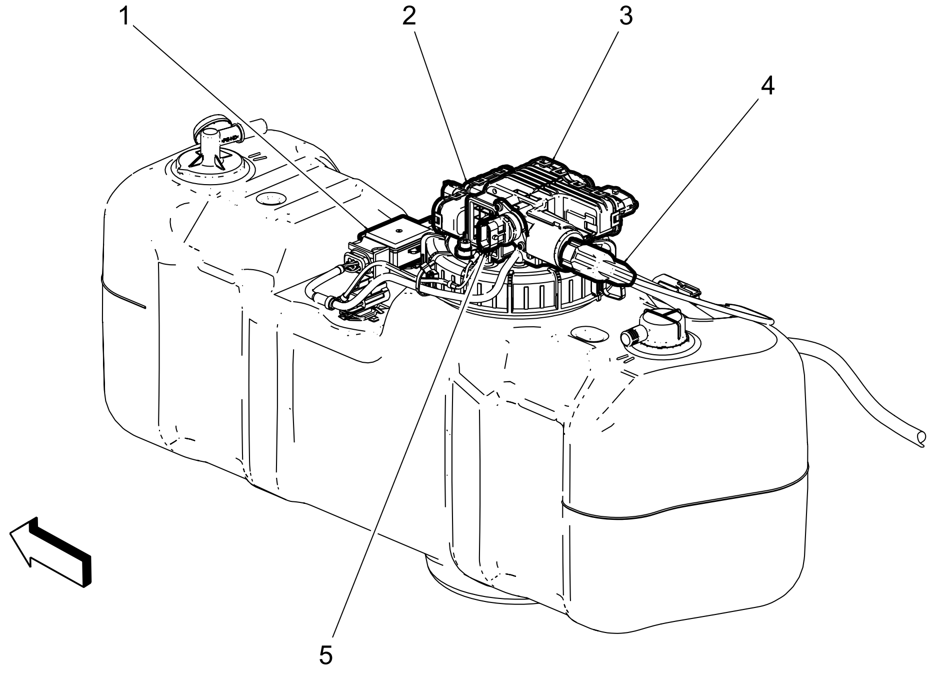
Frame and Underbody Components (1 of 2)



Items

1. B5LR Wheel Speed Sensor - Left Rear
2. B5LF Wheel Speed Sensor - Left Front
3. K17 Electronic Brake Control Module
4. B119 Multi-axis Acceleration Sensor
5. B5RF Wheel Speed Sensor - Right Front
6. B5RR Wheel Speed Sensor - Right Rear

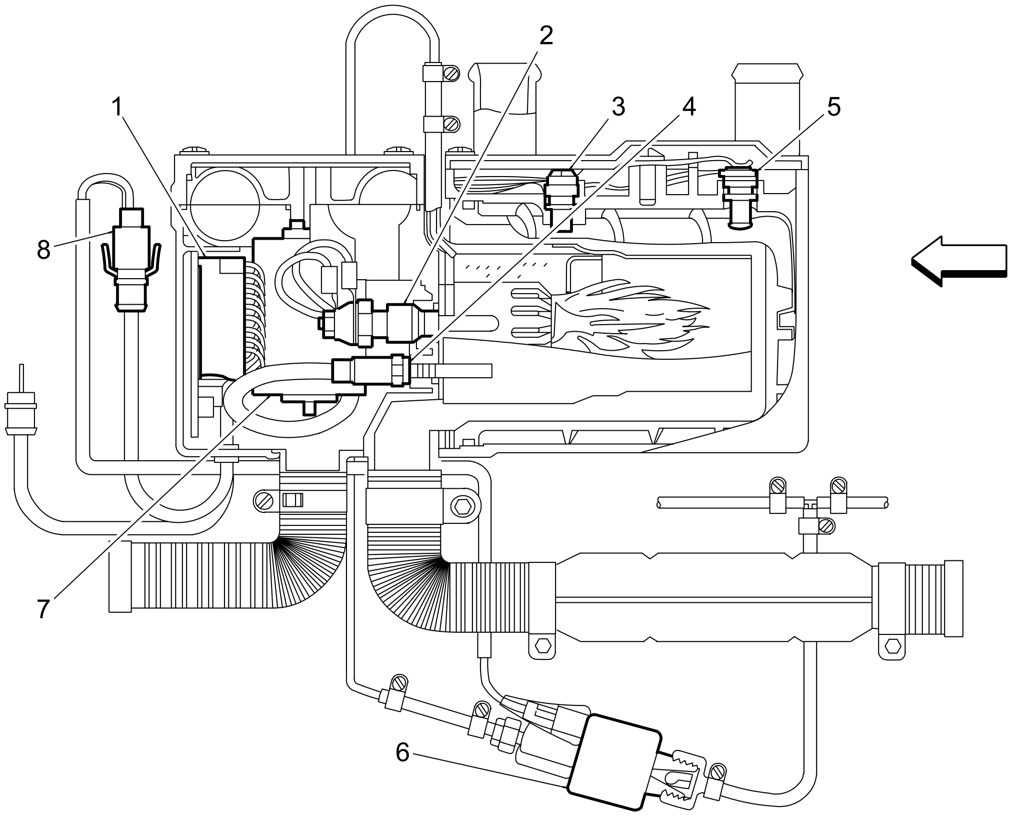
Reductant Tank Components



Items

1. B212 Reductant Sensor Module
2. Q62 Reductant Purge Solenoid Valve
3. G33 Reductant Pump
4. E52 Reductant Line Heater
5. B194 Reductant Pressure Sensor

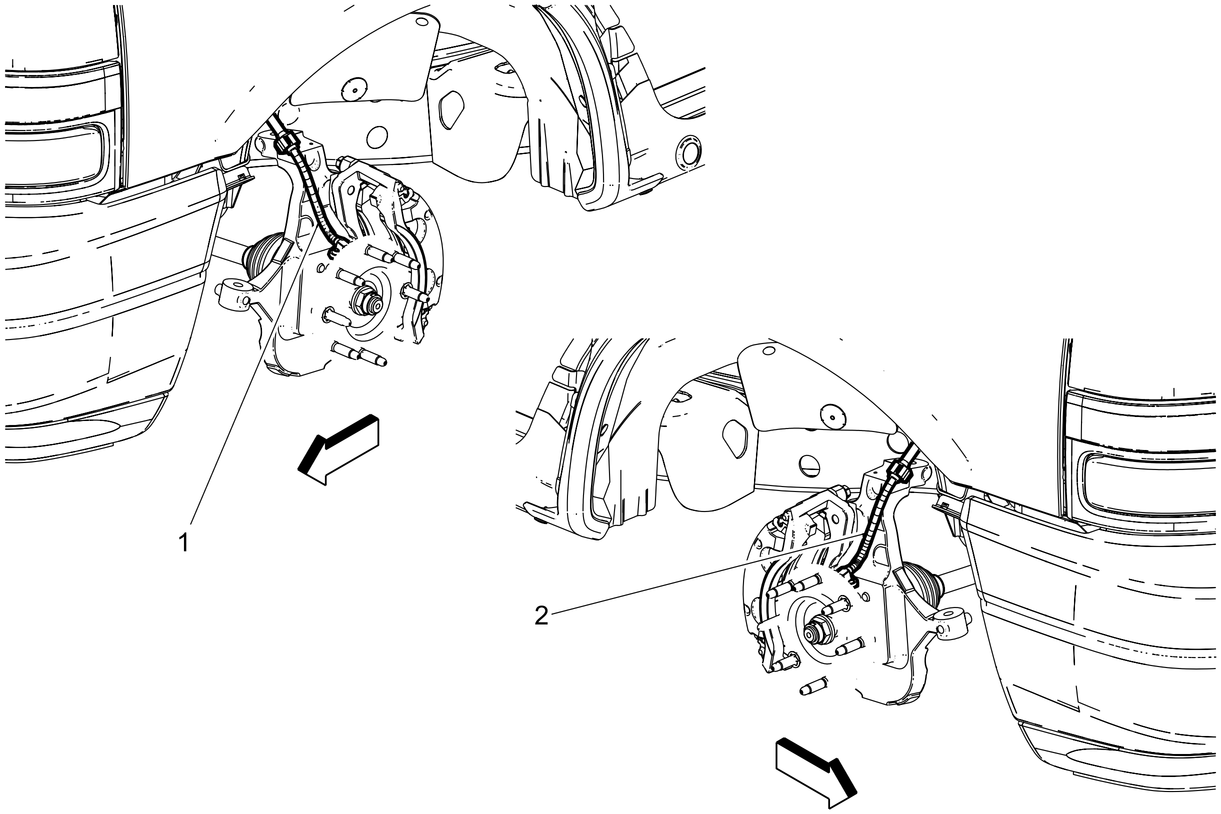
Coolant Heater Components (K08)



Items

1. K10 Coolant Heater Control Module
2. E20 Coolant Heater Glow Plug
3. B134A Coolant Heater Air Temperature Sensor
4. B134B Coolant Heater Combustion Sensor
5. B134C Coolant Heater Overheat Sensor
6. G7 Coolant Heater Fuel Pump
7. M11 Coolant Heater Blower Motor
8. E19 Coolant Heater

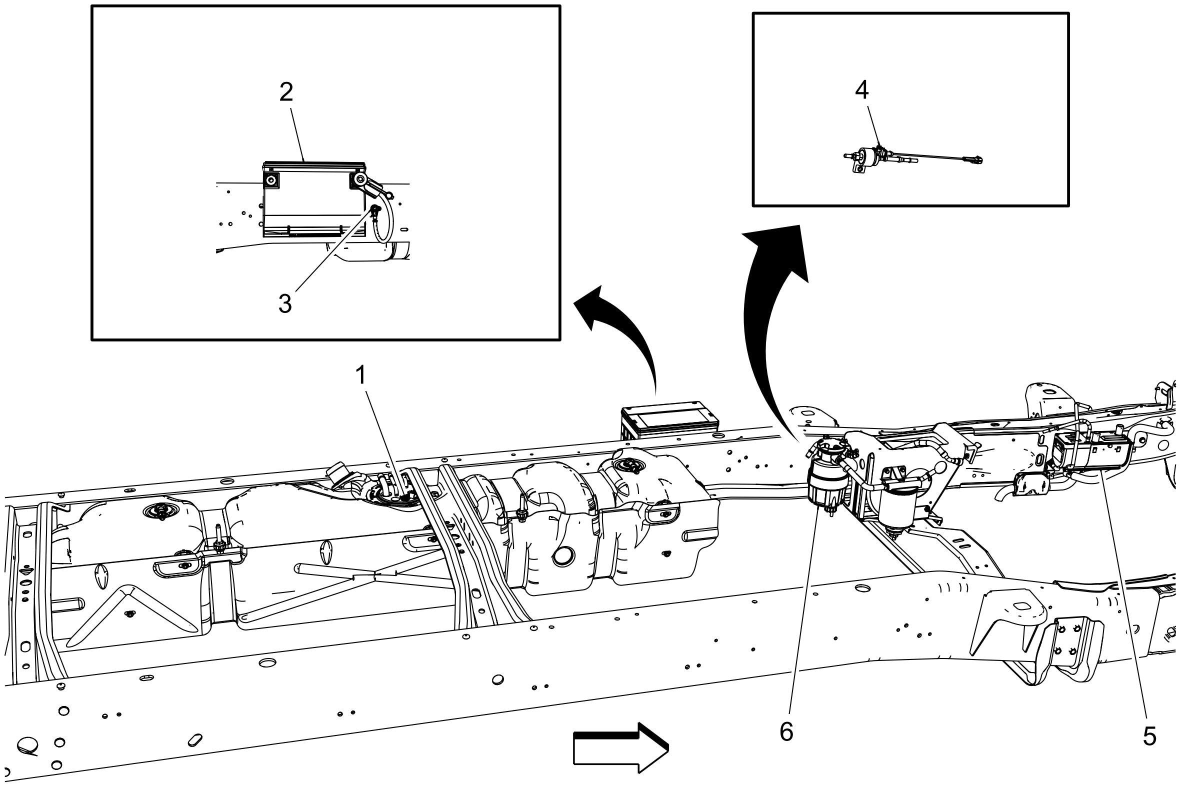
Front Wheel Speed Sensor Components



Items

1. B5LF Wheel Speed Sensor - Left Front
2. B5RF Wheel Speed Sensor - Right Front

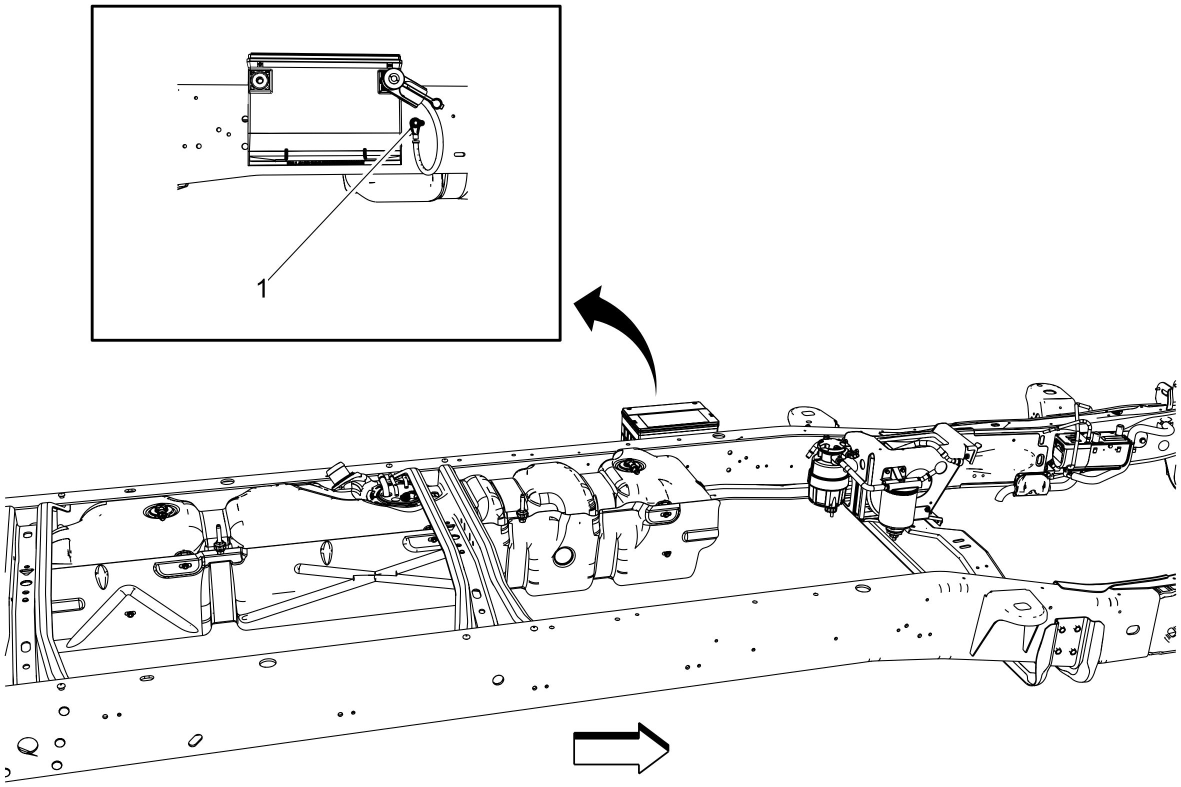
Frame and Underbody Components (2 of 2, LGH)



Items

1. B46 Fuel Level Sensor
2. C1B Battery - Auxiliary
3. G305
4. G7 Coolant Heater Fuel Pump
5. E19 Coolant Heater
6. G12 Fuel Pump

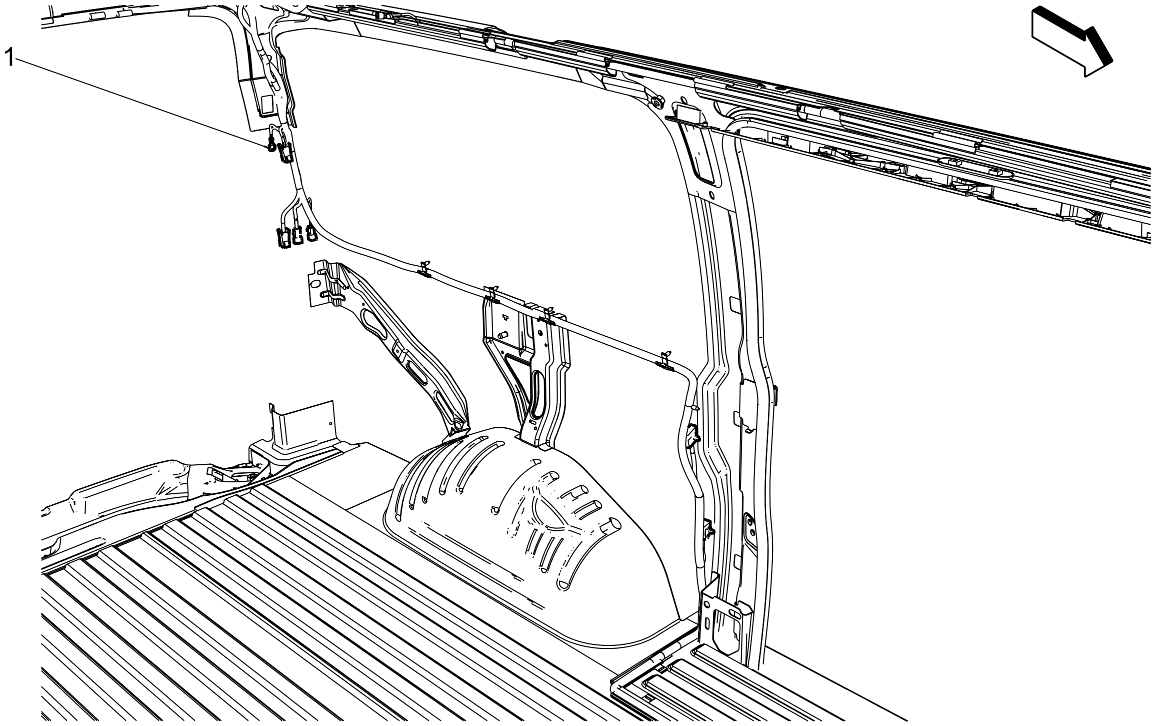
G305



Items

1. G305

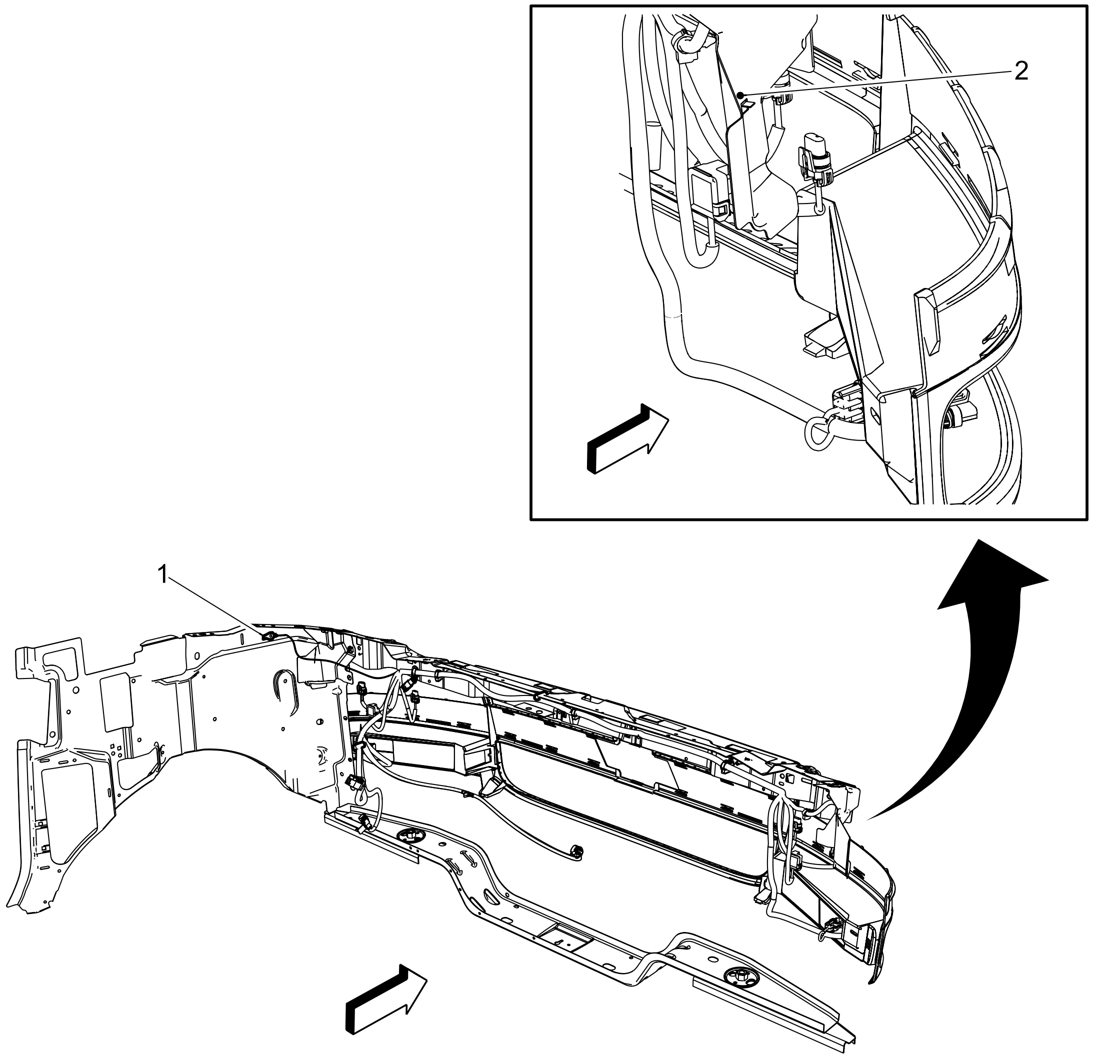
G402 (Passenger or Cargo)



Items

1. G402

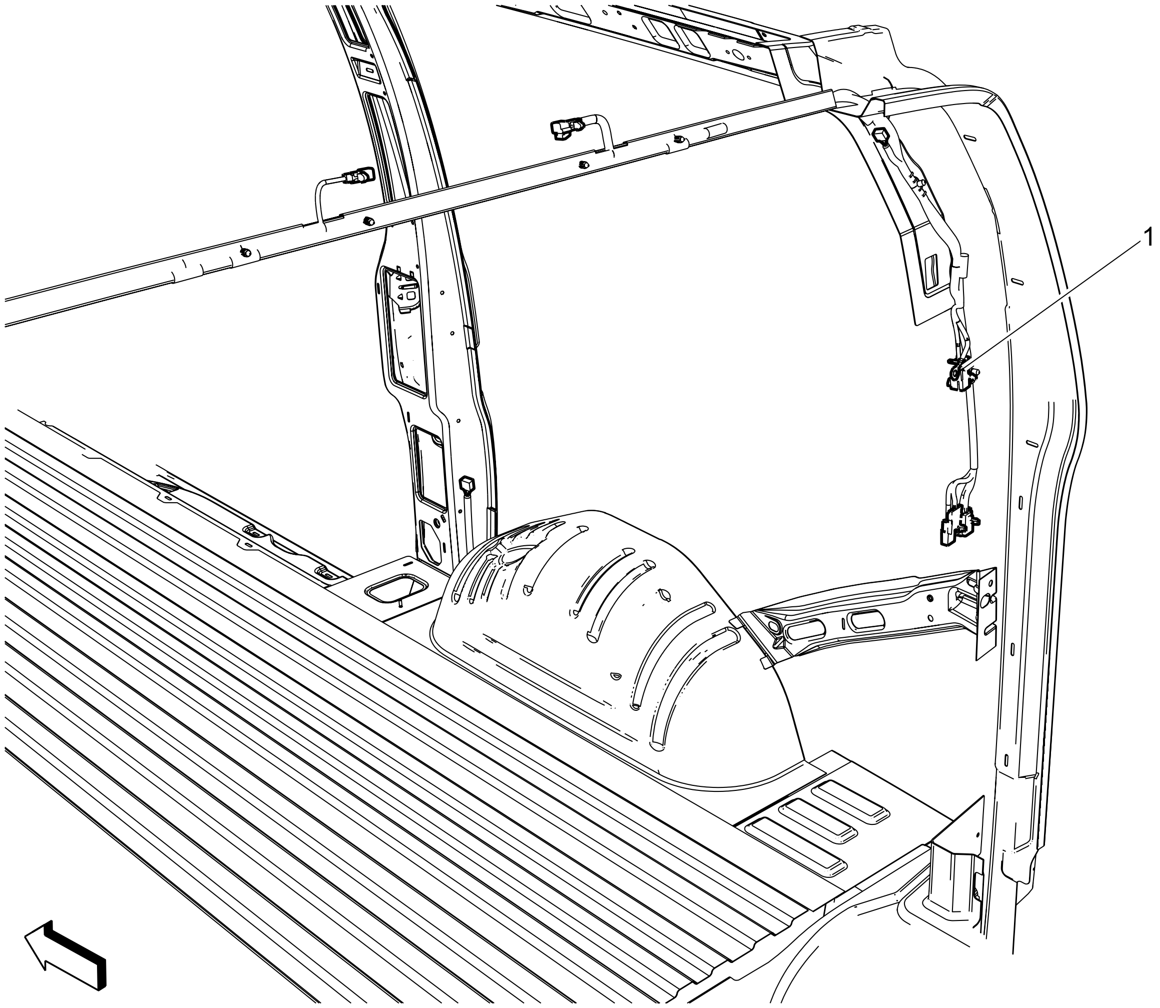
G100 and G101



Items

1. G100
2. G101

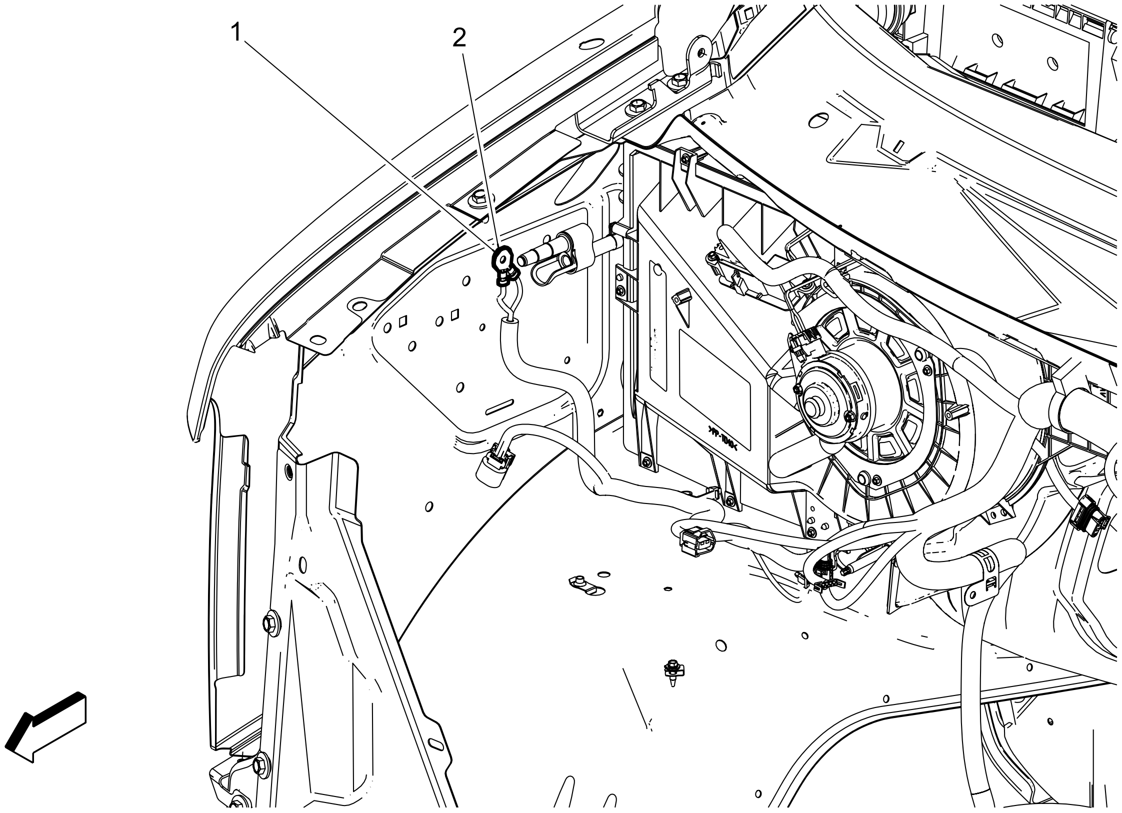
G401 (Passenger or Cargo)



Items

1. G401

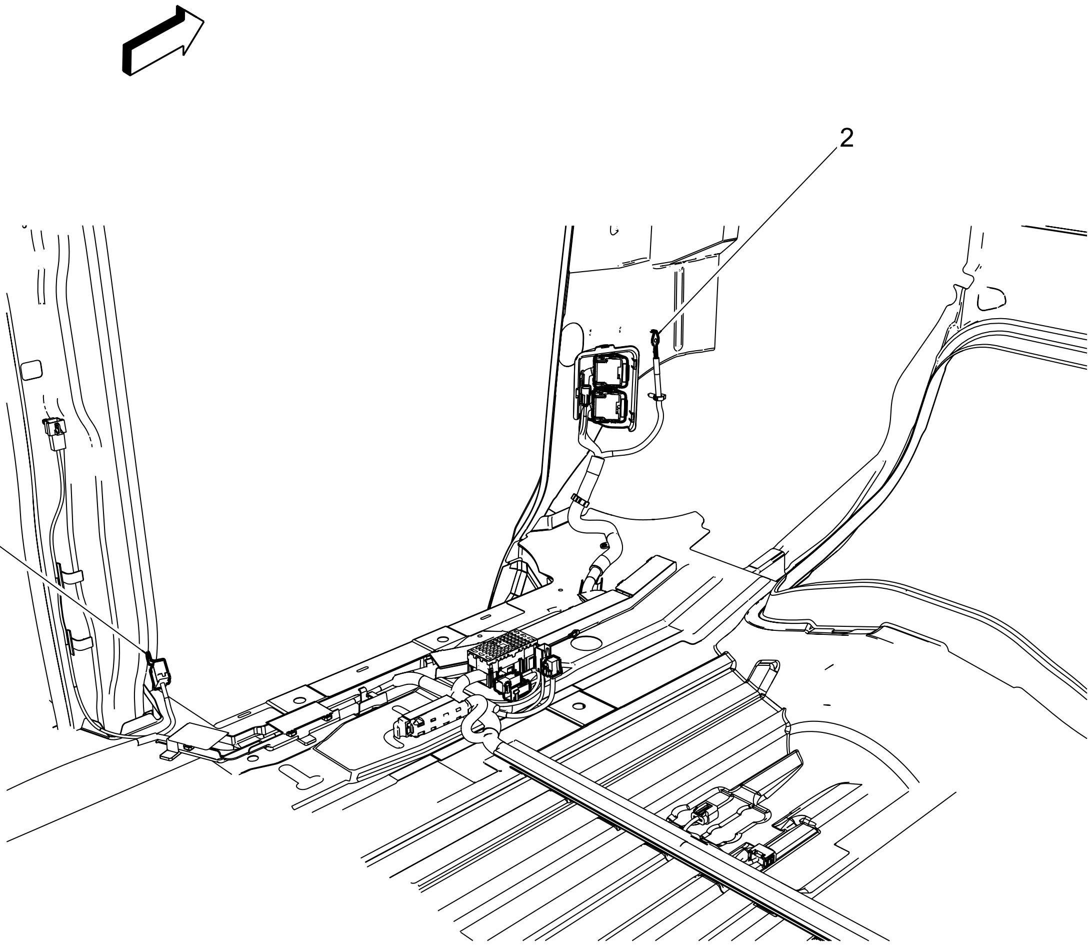
G102 and G103 (LGH)



Items

1. G102
2. G103

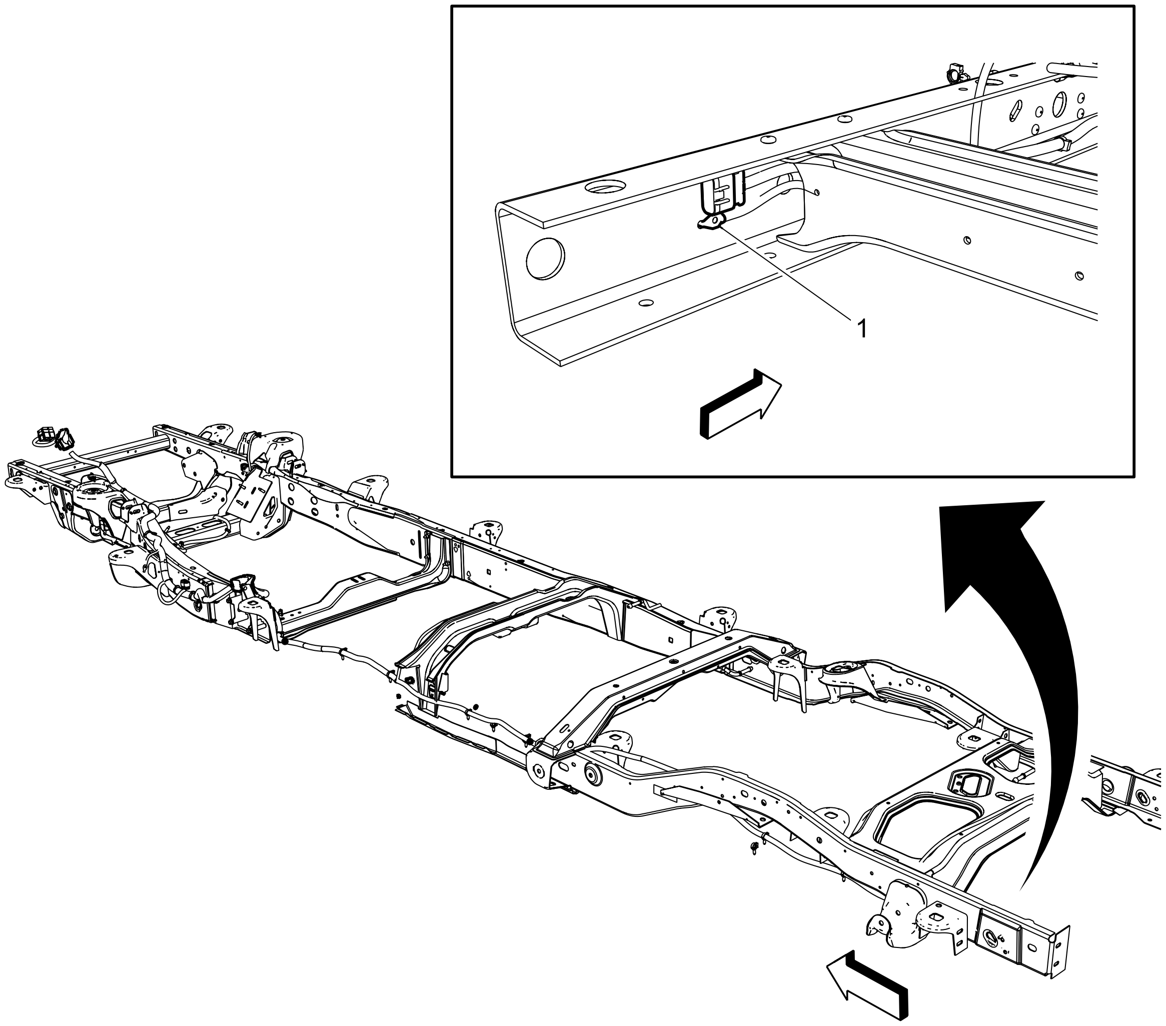
G302 and G347



Items

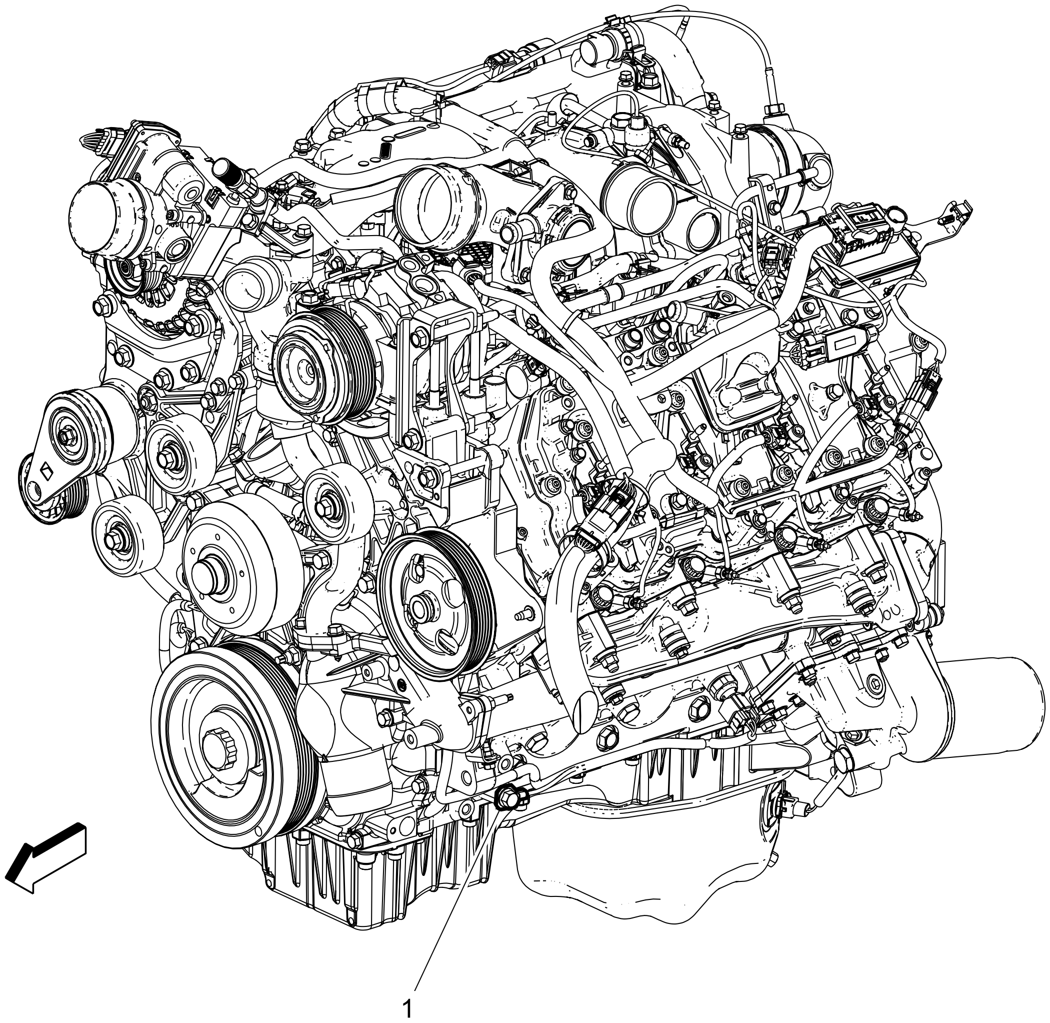
1. G347
2. G302

G400



Items

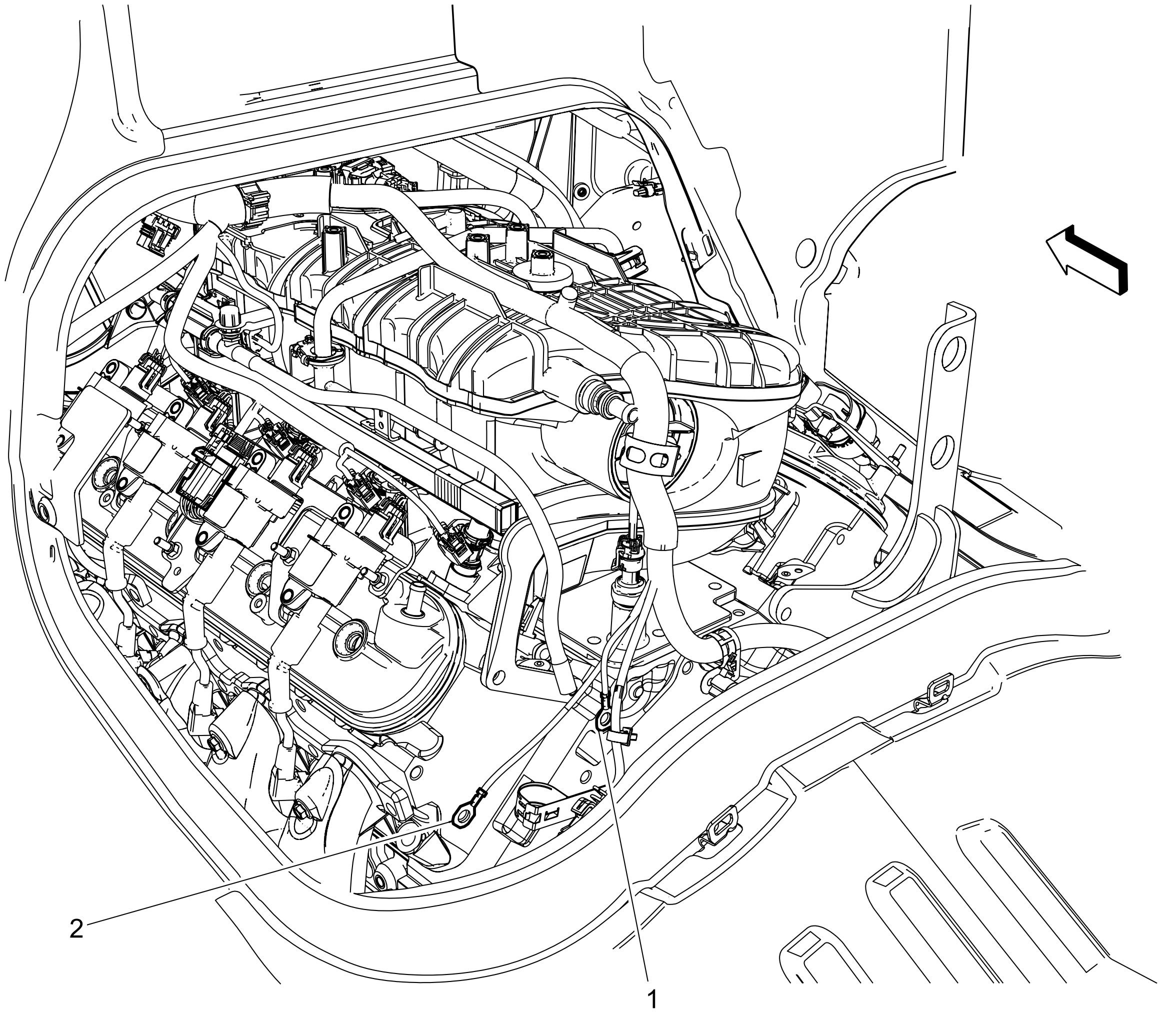
1. G400



Items

1. G110

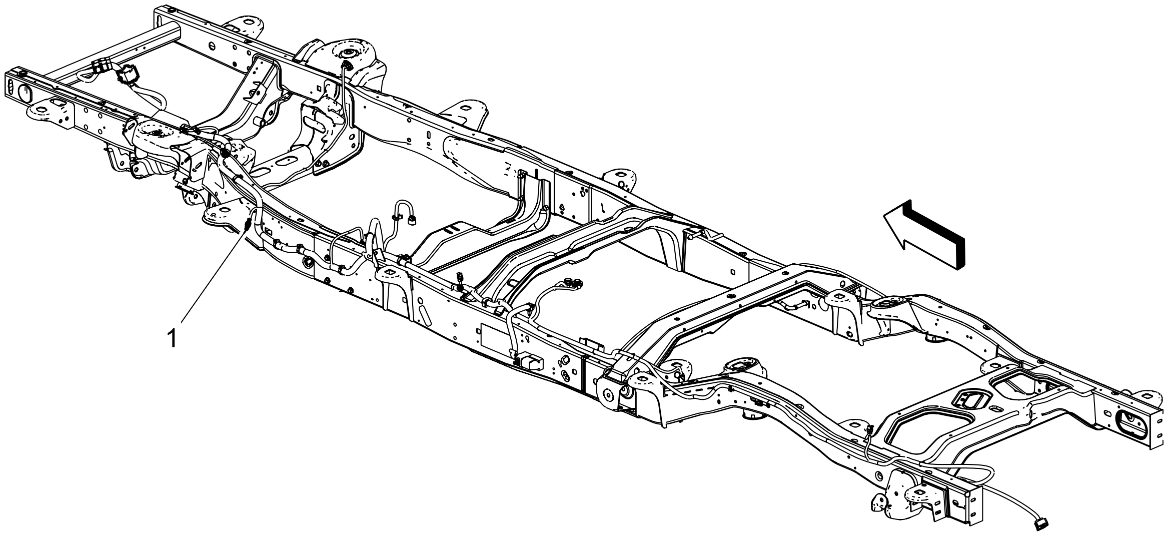
G102 and G103 (L20, L96, or LC8)



Items

1. G103
2. G102

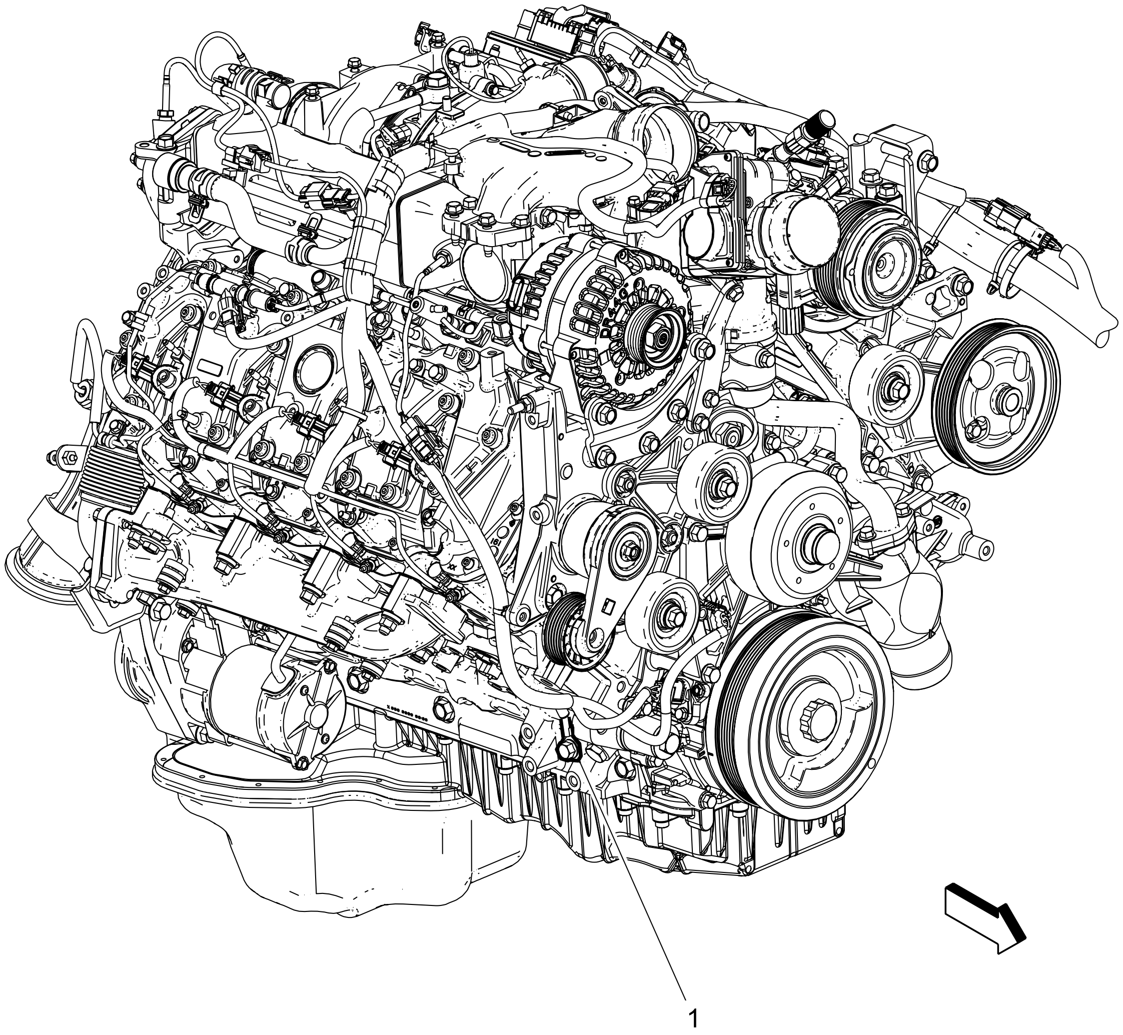
G300 (L20, L96, or LC8)



Items

1. G300

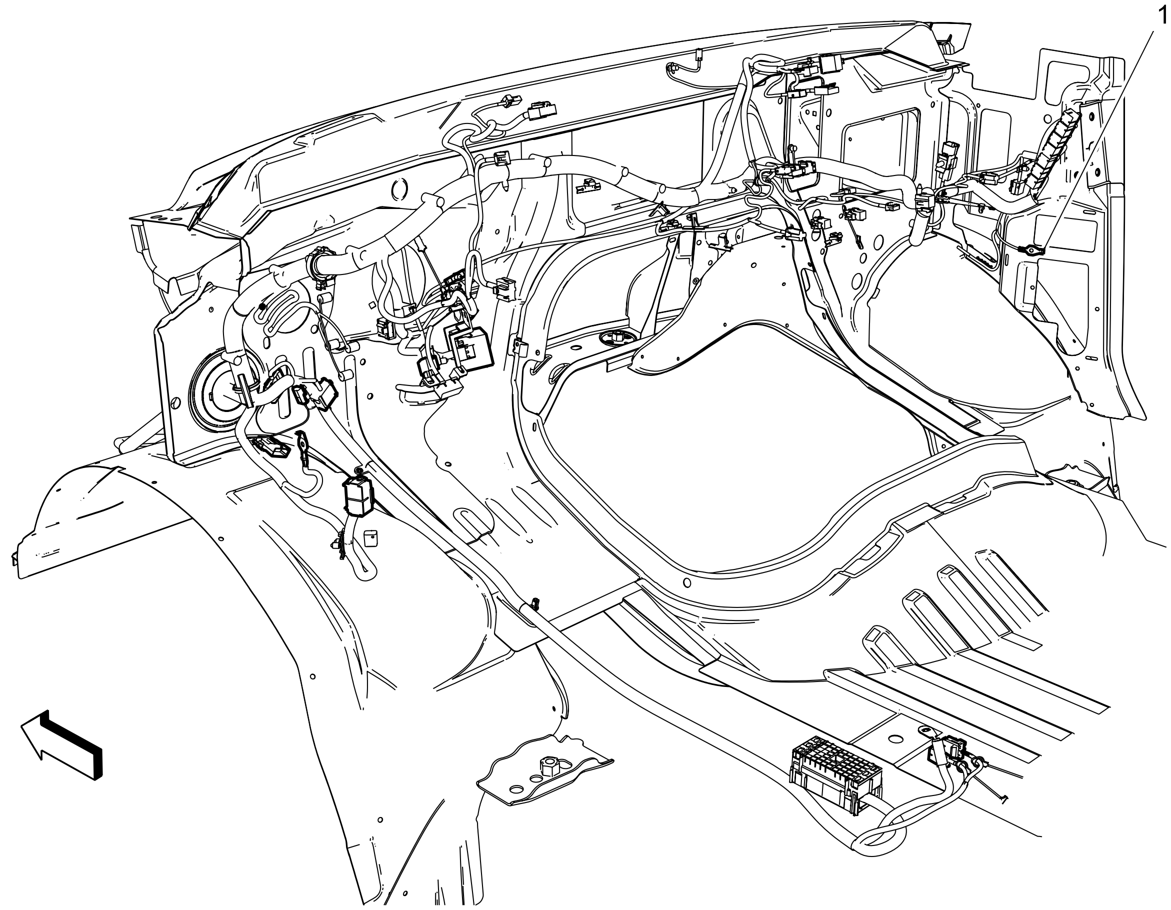
G109 (LGH)



Items

1. G109

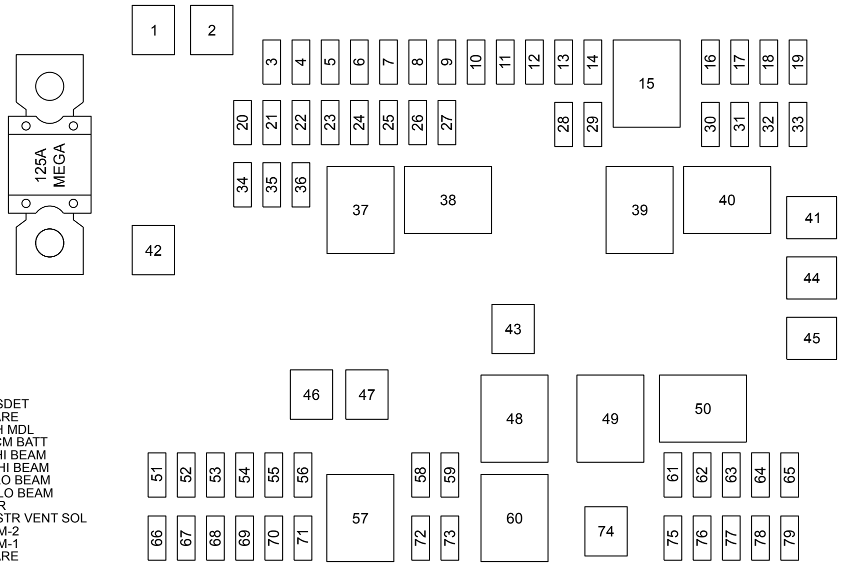
G304



Items

1. G304

X50A Fuse Block - Underhood Label (with KI4)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MINI FUSES

3	15A	RT STOP/TRN TRLR
4	10A	SPARE
5	10A	SPARE
6	10A	FSCM IGN
7	10A	BCM-5
8	10A	BCM-7
9	10A	BCM-4
10	10A	IPC
11	30A	TRLR WRG
12	10A	SPARE
13	10A	DISPLY MIR/REAR B/U CAMERA
14	15A	WASH
16	20A	HORN
17	15A	TRANS
18	15A	A/C CMPRSR
19	10A	ECM BATT
20	10A	SPARE
21	15A	LT STOP/TRN TRLR
22	10A	SPARE
23	15A	SPARE
24	30A	GAS FUEL PUMP
24	20A	DIESEL FUEL PUMP
24	7.5A	CNG CONTROL MODULE (4 TANK)
24	5A	CNG CONTROL MODULE (3 TANK)
25	20A	AUX PWR OUTLET
26	10A	BCM-3
27	10A	SEO
28	10A	AIRBAG
29	10A	STR/WHL/SNSR
30	15A	ECM IGN/GLOW PLUG MDL IGN
31	15A	TCM IGN
32	10A	TCM BATT
33	10A	OBSDET
34	15A	SPARE
35	15A	FOH MDL
36	20A	FSCM BATT
51	10A	LT HI BEAM
52	10A	RT HI BEAM
53	10A	LT LO BEAM
54	10A	RT LO BEAM
55	25A	WPR
56	10A	CNSTR VENT SOL
58	10A	BCM-2
59	10A	BCM-1
61	15A	SPARE
62	10A	O2 SNSR 2 (POST)/EV FAN
63	10A	SPARE
64	15A	MAF/CNSTR VENT/HUMIDITY SENSOR
65	20A	ODD IGN/INJ
66	10A	DRL2 (LOLVL-V22)
67	15A	DRL1 (UPLVL+V22)
68	15A	AUX STOP LAMP(S)
69	10A	PWR EXT TRAILER
70	10A	SPARE
71	15A	FUEL HTR/FLEX FUEL SNSR
72	10A	BCM-6
73	20A	LTR/DLC
75	15A	V6 FUEL INJ
76	10A	SOOT SNSR
77	10A	O2 SNSR 1 (PRE)/CLS
78	10A	ECM PWR/TRN
79	20A	EVEN IGN/INJ

J-CASE FUSE

1	50A	ABS MTR
2	40A	ABS MDL
41	20A	SPARE
42	30A	TRLR WRG
43	40A	FAN HI
44	40A	STRTR SOL
45	30A	ECM PWR/TRN
46	25A	AC/DC INV
47	40A	FAN LO
74	40A	FRT BLWR

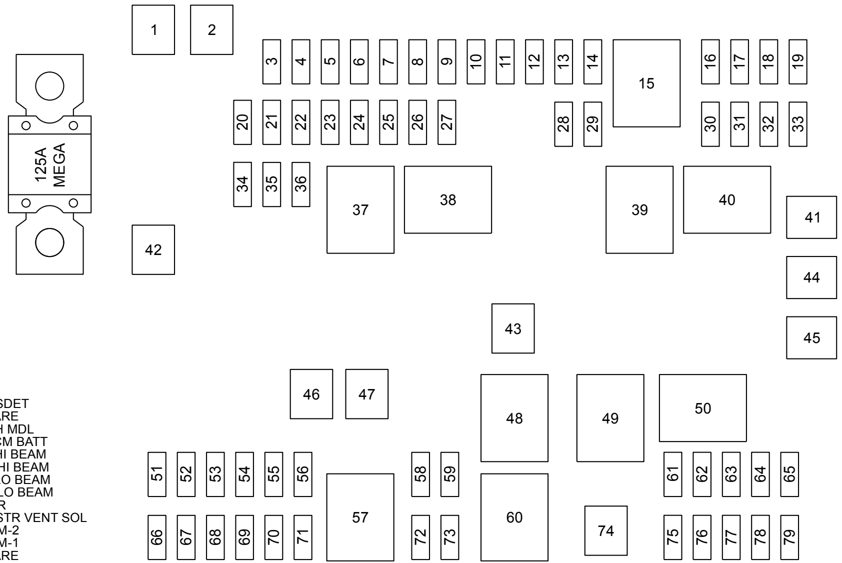
RELAYS

15	MICRO G8V	RUN/CRNK
37	MICRO G8V	SPARE
38	MICRO G8V	FUEL PUMP
39	MICRO G8V	CRNK
40	MICRO G8V	A/C CMPRSR
48	MICRO G8V	FAN HI
49	MICRO G8V	PWR/TRN
50	SOLID STATE	SPARE
57	MICRO G8V	FAN LO
60	MICRO G8V	FAN CNTRL

CIRCUIT BOARD RELAY (NOT SHOWN)

K3	WPR HI
K5	HORN/WASH
K6	LO BEAM
K7	HI BEAM
K9	TRLR LT STOP/TRN
K11	STOP LAMP(S)
K13	WPR
K18	TRLR RT STOP/TRN
K19	DRL

X50A Fuse Block - Underhood Label (without KI4)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MINI FUSES

3	15A	RT
4	10A	SPARE
5	10A	SPARE
6	10A	FSCM IGN
7	10A	BCM-5
8	10A	BCM-7
9	10A	BCM-4
10	10A	IPC
11	30A	TRLR WRG
12	10A	SPARE
13	10A	DISPLY MIR/REAR B/U CAMERA
14	15A	WASH
16	20A	HORN
17	15A	TRANS
18	15A	A/C CMPRSR
19	10A	ECM BATT
20	10A	SPARE
21	15A	LT STOP/TRN TRLR
22	10A	SPARE
23	15A	SPARE
24	30A	GAS FUEL PUMP
24	20A	DIESEL FUEL PUMP
24	7.5A	CNG CONTROL MODULE (4 TANK)
24	5A	CNG CONTROL MODULE (3 TANK)
25	20A	AUX PWR OUTLET
26	10A	BCM-3
27	10A	SEO
28	10A	AIRBAG
29	10A	STR/WHL/SNSR
30	15A	ECM IGN/GLOW PLUG MDL IGN
31	15A	TCM IGN
32	10A	TCM BATT
33	10A	OBSDET
34	15A	SPARE
35	15A	FOH MDL
36	20A	FSCM BATT
51	10A	LT HI BEAM
52	10A	RT HI BEAM
53	10A	LT LO BEAM
54	10A	RT LO BEAM
55	25A	WPR
56	10A	CNSTR VENT SOL
58	10A	BCM-2
59	10A	BCM-1
61	15A	SPARE
62	10A	O2 SNSR 2 (POST)/EV FAN
63	10A	SPARE
64	15A	MAF/CNSTR VENT/HUMIDITY SENSOR
65	20A	ODD IGN/INJ
66	10A	DRL2 (LOLVL-V22)
67	15A	DRL1 (UPLVL+V22)
68	15A	AUX STOP LAMP(S)
69	10A	PWR EXT TRAILER
70	10A	SPARE
71	15A	FUEL HTR/FLEX FUEL SNSR
72	10A	BCM-6
73	20A	LTR/DLC
75	15A	V6 FUEL INJ
76	10A	SOOT SNSR
77	10A	O2 SNSR 1 (PRE)/CLS
78	10A	ECM PWR/TRN
79	20A	EVEN IGN/INJ

J-CASE FUSE

1	50A	ABS MTR
2	40A	ABS MDL
41	20A	SPARE
42	30A	TRLR WRG
43	40A	FAN HI
44	40A	STRTR SOL
45	30A	ECM PWR/TRN
46	30A	SPARE
47	40A	FAN LO
74	40A	FRT BLWR

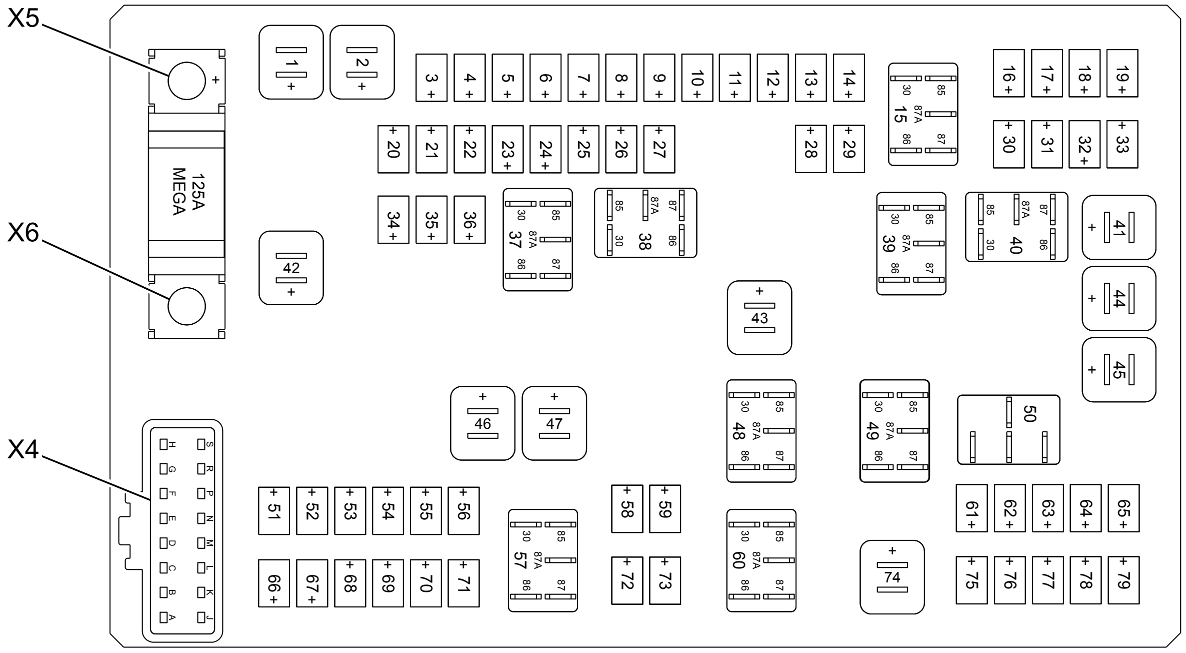
RELAYS

15	MICRO G8V	RUN/CRNK
37	MICRO G8V	SPARE
38	MICRO G8V	FUEL PUMP
39	MICRO G8V	CRNK
40	MICRO G8V	A/C CMPRSR
48	MICRO G8V	FAN HI
49	MICRO G8V	PWR/TRN
50	SOLID STATE	SPARE
57	MICRO G8V	FAN LO
60	MICRO G8V	FAN CNTRL

CIRCUIT BOARD RELAY (NOT SHOWN)

K3	WPR HI
K5	HORN/WASH
K6	LO BEAM
K7	HI BEAM
K9	TRLR LT STOP/TRN
K11	STOP LAMP(S)
K13	WPR
K18	TRLR RT STOP/TRN
K19	DRL

X50A Fuse Block - Underhood Top View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X6
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MEGA
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X50A Fuse Block - Underhood Usage

No.	Device Label Name	Device Assigned Name	Rating	Description
Fuses and Replaceable Relays				
MEGA	—	MEGA	125 A	X52A Fuse Block - Passenger Compartment
1	ABS MTR	F1UA	50 A	K17 Electronic Brake Control Module
2	ABS MDL	F2UA	40 A	K17 Electronic Brake Control Module
3	RT STOP/TURN TRLR	F3UA	15 A	X88 Trailer Connector (with KI4)
3	RT	F3UA	15 A	X88 Trailer Connector (without KI4)
4	SPARE	F4UA	10 A	Not Used
5	SPARE	F5UA	10 A	Not Used
6	FSCM IGN	F6UA	10 A	Not Used
7	BCM-5	F7UA	10 A	K9 Body Control Module
8	BCM-7	F8UA	10 A	K9 Body Control Module
9	BCM-4	F9UA	10 A	K9 Body Control Module
10	IPC	F10UA	10 A	P16 Instrument Cluster
11	TRLR WRG	F11UA	30 A	W8 Blunt Cut - Trailer Provision (UY7)
12	SPARE	F12UA	10 A	Not Used

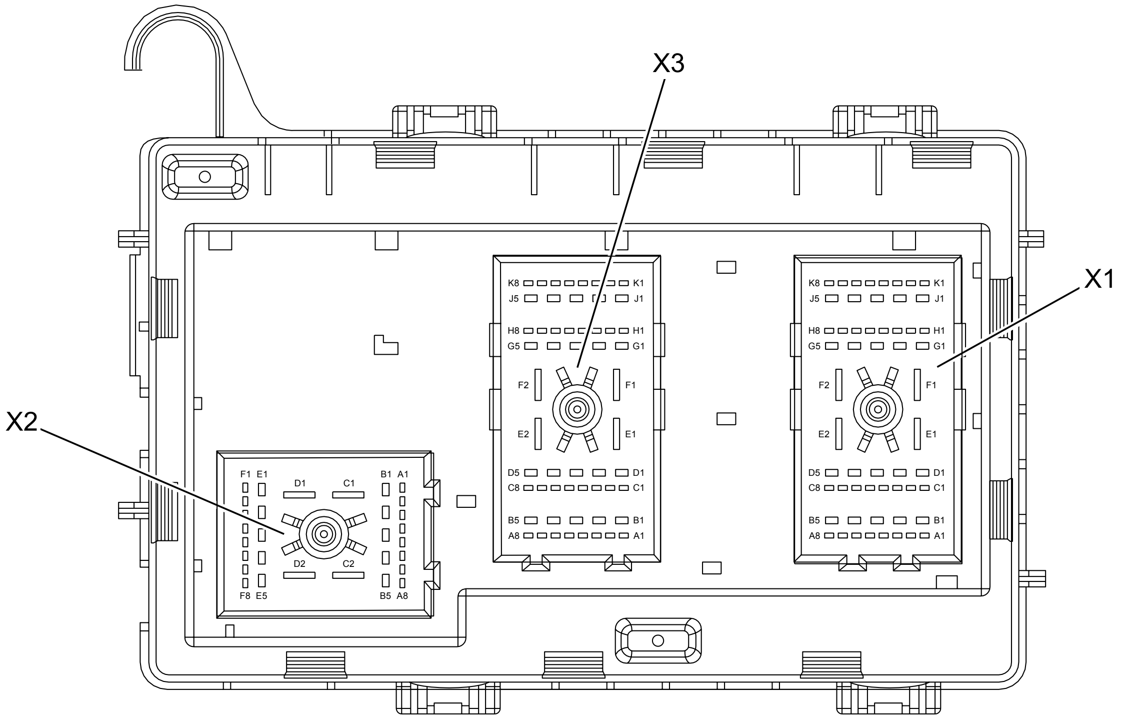
12	SPARE	F12UA	10 A	Not Used
13	DISPLY MIR/REAR B/U CAMERA	F13UA	10 A	A10 Inside Rearview Mirror (UVC), B87 Rearview Camera (UVC)
14	WASH	F14UA	15 A	Windshield Washer Fluid Pump
15	RUN/CRANK	KR93 Ignition Run/Crank Relay	—	A10 Inside Rearview Mirror, B87 Rearview Camera, B99 Steering Wheel Angle Sensor, K20 Engine Control Module, K34 Glow Plug Control Module, K36 Inflatable Restraint Sensing and Diagnostic Module, P14 Passenger Air Bag Disabled Indicator, P16 Instrument Cluster, Q8 Control Solenoid Valve Assembly, S40 Passenger Air Bag Disable Switch
16	HORN	F16UA	20 A	P13 Horn Assembly
17	TRANS	F17UA	15 A	Not Used
18	A/C CMPRSR	F18UA	15 A	Q2 A/C Compressor Clutch (C60)
19	ECM BATT	F19UA	10 A	K20 Engine Control Module
20	SPARE	F20UA	10 A	Not Used
21	LT STOP/TRN TRLR	F21UA	15 A	X88 Trailer Connector
22	SPARE	F22UA	10 A	Not Used
23	SPARE	F23UA	15 A	Not Used
24	GAS FUEL PUMP DIESEL FUEL PUMP CNG CONTROL MODULE (4 TANK) CNG CONTROL MODULE (3 TANK)	F24UA	30 A 20 A 7.5 A 5 A	Fuel Pump and Sender Assembly (L20, L96 or LU3) Fuel Pump (LGH) CNG Control Module (FHZ with UFP) CNG Control Module (FHZ with UFM)
25	AUX PWR OUTLET	F25UA	20 A	X80B Accessory Power Receptacle - Center Console 2
26	BCM-3	F26UA	10 A	K9 Body Control Module
27	SEO	F27UA	10 A	P16 Instrument Cluster
28	AIRBAG	F28UA	10 A	K36 Inflatable Restraint Sensing and Diagnostic Module, P14 Passenger Air Bag Disabled Indicator (AL0), S40 Passenger Air Bag Disable Switch (C99)
29	STR/WHL/SNSR	F29UA	10 A	B99 Steering Wheel Angle Sensor
30	ECM IGN/GLOW PLUG MDL IGN	F30UA	15 A	K20 Engine Control Module, K34 Glow Plug Control Module (LGH)
31	TCM IGN	F31UA	15 A	T12 Automatic Transmission Assembly
32	TCM BATT	F32UA	10 A	T12 Automatic Transmission Assembly
33	OBSDET	F33UA	10 A	K41R Rear Parking Assist Control Module
34	SPARE	F34UA	15 A	Not Used
35	FOH MDL	F35UA	15 A	E19 Coolant Heater (K08)
36	FSCM BATT	F36UA	20 A	Not Used
37	SPARE	KR150 Relay - Spare	—	Not Used

38	FUEL PUMP	KR23A Fuel Pump Relay	—	A7 Fuel Pump and Level Sensor Assembly (L20 or L96), G12 Fuel Pump (LGH, or KO7 with UFM), K103 Fuel Injector Control Module (KO7 with UFP), K119 CNG Control Module (FHZ), Q53 Fuel Cut-Off Solenoid Valve (KO7 with UFM)
39	CRNK	KR27 Starter Relay	—	M64 Starter Motor
40	A/C CMPRSR	KR29 A/C Compressor Clutch Relay	—	Q2 A/C Compressor Clutch
41	SPARE	F41UA	20 A	Not Used
42	TRLR WRG	F42UA	30 A	X88 Trailer Connector (UY7)
43	FAN HI	F43UA	40 A	Not Used
44	STRTR SOL	F44UA	40 A	M64 Starter Motor
45	ECM PWR/TRN	F45UA	30 A	K20 Engine Control Module (LGH)
46	SPARE	F46UA	30 A	Not Used (Without KI4)
46	AC/DC INV	F46UA	25 A	TI Accessory DC/AC Power Iverter Module (KI4)
47	FAN LO	F47UA	40 A	Not Used
48	FAN HI	KR20D Cooling Fan High Speed Relay	—	Not Used
49	PWR/TRN	KR75 Engine Controls Ignition Relay	—	B52C Heated Oxygen Sensor - Bank 1 Sensor 1 (L20, L96, or LC8), B52D Heated Oxygen Sensor - Bank 1 Sensor 2 (L20, L96, or LC8), B52E Heated Oxygen Sensor - Bank 2 Sensor 1 (L20, L96, or LC8), B52F Heated Oxygen Sensor - Bank 2 Sensor 2 (L20, L96, or LC8), B75B Mass Air Flow/Intake Air Temperature Sensor, B136 Exhaust Particulate Matter Sensor (LGH), B198 Fuel Composition Sensor (L20, L96, or LC8), B212 Reductant Sensor Module (LGH), G10 Cooling Fan Motor (LGH), K20 Engine Control Module, Q12 Evaporative Emission Purge Solenoid Valve (L20, L96, or LC8), Q17A Fuel Injector 1, Q17B Fuel Injector 2, Q17C Fuel Injector 3, Q17D Fuel Injector 4, Q17E Fuel Injector 5, Q17F Fuel Injector 6, Q17G Fuel Injector 7, Q17H Fuel Injector 8, T8A Ignition Coil 1 (L20, L96, or LC8), T8B Ignition Coil 2 (L20, L96, or LC8), T8C Ignition Coil 3 (L20, L96, or LC8), T8D Ignition Coil 4, T8E Ignition Coil 5 (L20, L96, or LC8), T8F Ignition Coil 6 (L20, L96, or LC8), T8G Ignition Coil 7 (L20, L96, or LC8), T8H Ignition Coil 8 (L20, L96, or LC8)
50	SPARE	KR150 Relay - Spare	—	Not Used
51	LT HI BEAM	F51UA	10 A	E4E Headlamp - Left High Beam (V22), E13L Headlamp - Left (Without V22)
52	RT HI BEAM	F52UA	10 A	E4F Headlamp - Right High Beam (V22), E13R Headlamp - Right (Without V22)
53	LT LO BEAM	F53UA	10 A	E4G Headlamp - Left Low Beam (V22), E13L Headlamp - Left (Without V22)
54	RT LO BEAM	F54UA	10 A	E4H Headlamp - Right Low Beam (V22), E13R Headlamp - Right (Without V22)
55	WPR	F55UA	25 A	KR12B Windshield Wiper Relay
56	CNSTR VENT SOL	F56UA	10 A	Q13 Evaporative Emission Vent Solenoid Valve (L20, L96, or LC8)
57	FAN LO	KR20C Cooling Fan Low Speed Relay	—	Not Used
58	BCM-2	F58UA	10 A	K9 Body Control Module
59	BCM-1	F59UA	10 A	K9 Body Control Module
60	FAN CNTRL	KR20E Cooling Fan Speed Control	—	Not Used

		Relay		
61	SPARE	F61UA	15 A	Not Used
62	O2 SNSR 2 (POST)/EV FAN	F62UA	10 A	B52D Heated Oxygen Sensor - Bank 1 Sensor 2 (L20, L96, or LC8), B52F Heated Oxygen Sensor - Bank 2 Sensor 2 (L20, L96, or LC8), G10 Cooling Fan Motor (LGH)
63	SPARE	F63UA	10 A	Not Used
64	MAF/CNSTR VENT/HUMIDITY SENSOR	F64UA	15 A	B75B Mass Air Flow/Intake Air Temperature Sensor (LGH), B75C Multifunction Intake Air Sensor, Q12 Evaporative Emission Purge Solenoid Valve (L20, L96, or LC8)
65	ODD IGN/INJ	F65UA	20 A	Q17A Fuel Injector 1, Q17C Fuel Injector 3, Q17E Fuel Injector 5, Q17G Fuel Injector 7, T8A Ignition Coil 1 (L20, L96, or LC8), T8C Ignition Coil 3 (L20, L96, or LC8), T8E Ignition Coil 5 (L20, L96, or LC8), T8G Ignition Coil 7 (L20, L96, or LC8)
66	DRL2 (LOLVL-V22)	F66UA	10 A	E13L Headlamp - Left (Without V22)
67	DRL1 (UPLVL+V22)	F67UA	15 A	E4G Headlamp - Left Low Beam (V22)
68	AUX STOP LAMP(S)	F68UA	15 A	X405 (Cutaway)
69	PWR EXT TRAILER	F69UA	10 A	Not Used
70	SPARE	F70UA	10 A	Not Used
71	FUEL HTR/FLEX FUEL SNSR	F71UA	15 A	B198 Fuel Composition Sensor (L20, L96, or LC8)
72	BCM-6	F72UA	10 A	K9 Body Control Module
73	LTR/DLC	F73UA	20 A	E32 Cigarette Lighter Receptacle (DT4), X80A Accessory Power Receptacle - Center Console 1 (Without DT4), X84 Data Link Connector
74	FRT BLWR	F74UA	40 A	R3 Blower Motor Resistor
75	V6 FUEL INJ	F75UA	15 A	Not Used
76	SOOT SNSR	F76UA	10 A	B136 Exhaust Particulate Matter Sensor (LGH)
77	O2 SNSR 1 (PRE)/CLS	F77UA	10 A	B52C Heated Oxygen Sensor - Bank 1 Sensor 1 (L20, L96, or LC8), B52E Heated Oxygen Sensor - Bank 2 Sensor 1 (L20, L96, or LC8), B212 Reductant Sensor Module (LGH)
78	ECM PWR/TRN	F78UA	10 A	K20 Engine Control Module (L20, L96, or LC8)
79	EVEN IGN/INJ	F79UA	20 A	Q17B Fuel Injector 2 (L20, L96, or LC8), Q17D Fuel Injector 4 (L20, L96, or LC8), Q17F Fuel Injector 6 (L20, L96, or LC8), Q17H Fuel Injector 8 (L20, L96, or LC8), T8B Ignition Coil 2 (L20, L96, or LC8), T8D Ignition Coil 4 (L20, L96, or LC8), T8F Ignition Coil 6 (L20, L96, or LC8), T8H Ignition Coil 8 (L20, L96, or LC8)
K3	WPR HI	KR12C Windshield Wiper Speed Control Relay	—	M75 Windshield Wiper Motor
K5	HORN/WASH	KR3 Horn Relay KR11 Windshield Washer Pump Relay	—	P13 Horn Assembly, G24 Windshield Washer Pump
K6	LO BEAM	KR49 Headlamp Low Beam Relay	—	E4G Headlamp - Left Low Beam (V22), E4H Headlamp - Right Low Beam (V22), E13L Headlamp - Left (Without V22), E13R Headlamp - Right (Without V22)
K7	HI BEAM	KR48 Headlamp High Beam Relay	—	E4E Headlamp - Left High Beam (V22), E4F Headlamp - Right High Beam (V22), E13L Headlamp - Left (Without V22), E13R Headlamp - Right (Without V22)

K9	TRLR LT STOP/TRN	KR63L Trailer Stop/Turn Signal Lamp Relay - Left	—	X88 Trailer Connector
K11	STOP LAMP(S)	KR59 Stop Lamp Relay	—	X405 Cutaway Rear Lighting Connector to Chassis Harness (Cutaway)
K13	WPR	KR12B Windshield Wiper Relay	—	KR12C Windshield Wiper Speed Control Relay, M75 Windshield Wiper Motor
K18	TRLR RT STOP/TRN	KR63R Trailer Stop/Turn Signal Lamp Relay - Right	—	X88 Trailer Connector
K19	DRL	KR42 Daytime Running Lamps Relay	—	F66UA (V22), F67UA (Without V22)

X50A Fuse Block - Underhood Bottom View


X3
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H8
H1
G5
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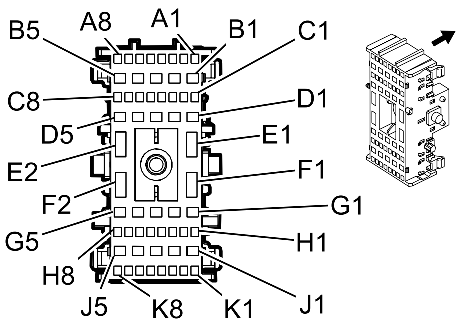
X50A Fuse Block - Underhood X1



Connector Part Information

Harness Type: Engine

OEM Connector: 15477823

Service Connector: 13574911

Description: 56-Way F 150, 280 GT Metri-Pack Series, (L-GY)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575718	J-35616-44 (YE)	J-38125-558	12110127	Delphi 19	F	G
II	13575735	J-35616-14 (GN)	J-38125-553	12191812	Delphi 19	C	A
III	13575735	J-35616-14 (GN)	J-38125-553	12191812	Delphi 19	E	C
IV	13575753	J-35616-4A (PU)	J-38125-553	15304711	Delphi 8	2	A
V	13575753	J-35616-4A (PU)	J-38125-553	15304711	Delphi 8	E	A

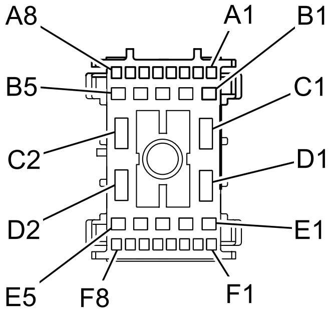
X50A Fuse Block - Underhood X1

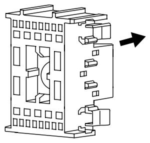
Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A1	0.5	RD/WH	440	Battery Positive Voltage	III	—
A2	0.35	RD/WH	1840	Battery Positive Voltage	III	—
A3 - A8	—	—	—	Not Occupied	—	—
B1	0.5	RD/WH	840	Battery Positive Voltage	V	—
B2	0.5	D-GN	59	A/C Compressor Clutch Control	V	—
B3	—	—	—	Not Occupied	—	—
B4	0.8	D-GN	29	Horn Control	IV	—

B5	0.5	PK	439	Run/Crank Ignition 1 Voltage	V	—
C1	—	—	—	Not Occupied	—	—
C2	0.5	D-GN/WH	459	A/C Compressor Clutch Relay Control	III	—
C3 - C5	—	—	—	Not Occupied	—	—
C6	0.5	YE/BK	625	Starter Enable Relay Control	III	—
C7	1	BK	1250	Ground	II	—
C8	0.5	D-GN/WH	465	Fuel Pump Primary Relay Control	III	—
D1 - D2	—	—	—	Not Occupied	—	—
D3	0.5	PK	2139	Run/Crank Ignition 1 Voltage	V	—
D4 - D5	—	—	—	Not Occupied	—	—
E1	5	PU	6	Starter Solenoid Crank Ignition Voltage	I	—
E2	—	—	—	Not Occupied	—	—
F1	3	PK	1439	Run/Crank Ignition 1 Voltage	I	—
F2	5	RD/BK	542	Battery Positive Voltage	I	—
G1	1	PK	1039	Run/Crank Ignition 1 Voltage	IV	—
G2	0.8	PK	1039	Run/Crank Ignition 1 Voltage	IV	—
G3	0.8	PK	1039	Run/Crank Ignition 1 Voltage	IV	—
G4	0.8	PK	1939	Run/Crank Ignition 1 Voltage	IV	—

G5	0.5	PK	1939	Run/Crank Ignition 1 Voltage	V	—
H1	—	—	—	Not Occupied	—	—
H2	0.8	PK	1339	Run/Crank Ignition 1 Voltage	II	—
H3 - H8	—	—	—	Not Occupied	—	—
J1	1	PK	1239	Run/Crank Ignition 1 Voltage	IV	—
J2	0.8	PK	1239	Run/Crank Ignition 1 Voltage	IV	—
J3	0.8	PK	1239	Run/Crank Ignition 1 Voltage	IV	—
J4 - J5	—	—	—	Not Occupied	—	—
K1	1	PK/BK	5293	Powertrain Main Relay Fused Supply (4)	II	—
	1	PK	539	Run/Crank Ignition 1 Voltage		—
K2	—	—	—	Not Occupied	—	—
K3	1	RD/BK	2842	Battery Positive Voltage	II	—
K4	0.5	PK	939	—	III	—
	1	PK	1539	Run/Crank Ignition 1 Voltage	II	—
K5 - K7	—	—	—	Not Occupied	—	—
K8	0.5	YE	5991	Powertrain Relay Coil Control	III	—

X50A Fuse Block - Underhood X2





Connector Part Information

Harness Type: Chassis

OEM Connector: 13567518

Service Connector: 19180280

Description: 30-Way F 150, 280 GT Metri-Pack 800 Series (BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575718	J-35616-44 (YE)	J-38125-558	12110127	Delphi 19	F	G
II	13575790	J-35616-2A (GY)	J-38125-553	15496302	Delphi 5	2	A
III	13580069	J-35616-2A (GY)	J-38125-553	15496302	Delphi 5	E	A
IV	19303704	J-35616-35 (VT)	J-38125-553	13525970	Delphi 4	2	A
V	19303704	J-35616-4A (PU)	J-38125-553	13525970	Delphi 4	2	A
VI	19303708	J-35616-35 (VT)	J-38125-553	13525969	Delphi 4	4	4
VII	19303708	J-35616-35 (VT)	J-38125-553	13525969	Delphi 4	F	D
VIII	19303708	J-35616-4A (PU)	J-38125-553	13525969	Delphi 4	F	D

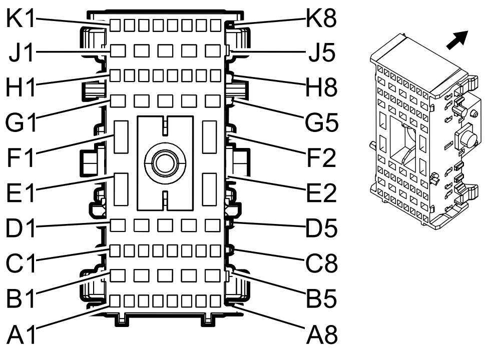
X50A Fuse Block - Underhood X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A1	—	—	—	Not Occupied	—	—
A2	1	YE	618	Left Rear Turn Signal Lamp Control	II	—
A3	0.8	D-BU/WH	149	Courtesy Lamp Control	II	—
A4	1	D-GN	619	Right Rear Turn Signal Lamp Control	II	—
A5 - A6	—	—	—	Not Occupied	—	—

A7	1	BN	2109	Trailer Park Lamp Control	II	—
A8	—	—	—	Not Occupied	—	—
B1	0.8	GY	120	Fuel Pump Control	IV	—
	3	GY	120		VIII	—
B2	0.8	PK/BK	5294	Powertrain Main Relay Fused Supply (5)	V	—
B3	—	—	—	Not Occupied	—	—
B4	2	RD/WH	1740	Battery Positive Voltage	VI	—
B5	1	D-GN	1619	Right Rear Trailer Stop/Turn Lamp Control	IV	—
	1	D-GN	1619		V	—
C1	—	—	—	Not Occupied	—	—
C2	3	RD/WH	1640	Battery Positive Voltage	I	—
D1	3	RD/BK	742	Battery Positive Voltage	I	—
D2	5	RD/BK	442	Battery Positive Voltage	I	—
E1	—	—	—	Not Occupied	—	—
E2	0.8	L-BU	1320	CHMSL Control	V	—
E3	3	D-BU	47	Trailer Auxiliary Control	VII	—
E4	1	YE	1618	Left Rear Trailer Stop/Turn Lamp Control	V	—
E5	—	—	—	Not Occupied	—	—
F1	1	L-GN	1624	Trailer Backup Lamp Control	II	—

F2	0.5	RD/WH	40	Battery Positive Voltage	III	—
F3	1	BN	2109	Trailer Park Lamp Control	II	—
F4 - F8	—	—	—	Not Occupied	—	—

X50A Fuse Block - Underhood X3



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 15477822

Service Connector: 19115189

Description: 56-Way F 150, 280 GT Metri-Pack 800 Series (BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575718	J-35616-44 (YE)	J-38125-558	12110127	Delphi 19	F	G
II	13575735	J-35616-14 (GN)	J-38125-553	12191812	Delphi 19	C	A
III	13575735	J-35616-14 (GN)	J-38125-553	12191812	Delphi 19	E	C
IV	13575753	J-35616-4A (PU)	J-38125-553	15304711	Delphi 8	2	A
V	13575753	J-35616-4A (PU)	J-38125-553	15304711	Delphi 8	E	A
VI	13575754	J-35616-4A (PU)	J-38125-553	15304713	Delphi 19	4	4
VII	13575754	J-35616-4A (PU)	J-38125-553	15304713	Delphi 19	F	D

X50A Fuse Block - Underhood X3

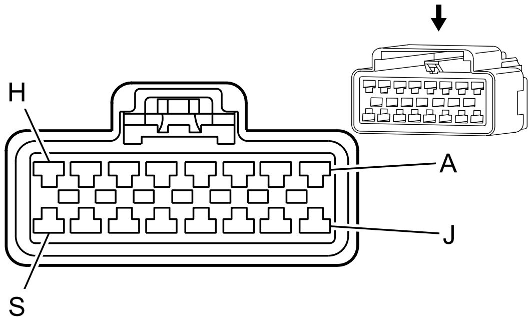
Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A1	0.35	PK	1639	Run/Crank Ignition 1 Voltage	III	—
A2	0.35	RD/WH	2840	Battery Positive Voltage	III	—
A3	0.8	RD/WH	2240	Battery Positive Voltage	II	—
A4	0.8	RD/WH	3040	Battery Positive Voltage	II	—
A5	0.5	RD/WH	2540	Battery Positive Voltage	III	—

A6	—	—	—	Not Occupied	—	—
A7	0.8	RD/WH	2740	Battery Positive Voltage	II	—
A8	—	—	—	Not Occupied	—	—
B1	3	RD/WH	3940	Battery Positive Voltage	VII	—
B2	0.35	PK	1139	Run/Crank Ignition 1 Voltage	V	—
B3	0.35	PK	1139	Run/Crank Ignition 1 Voltage	V	—
B4	1	RD/WH	1040	Battery Positive Voltage	IV	—
B5	1	BN	2109	Trailer Park Lamp Control	IV	—
C1	0.5	PK	239	Run/Crank Ignition 1 Voltage	III	—
C2	0.5	PK	2239	Run/Crank Ignition 1 Voltage	III	—
C3	—	—	—	Not Occupied	—	—
C4	0.35	OG	5186	Left Trailer Turn Signal Lamp Control	III	—
C5	1	BN	2109	Trailer Park Lamp Control	II	—
C6	1	D-GN	619	Right Rear Turn Signal Lamp Control	II	—
C7	0.8	D-BU/WH	149	Courtesy Lamp Control	II	—
C8	1	YE	618	Left Rear Turn Signal Lamp Control	II	—
D1	0.5	OG	228	Windshield Washer Pump Control	V	—

D2	0.35	YE	5199	Run/Crank Relay Coil Control	V	—
D3	1	L-GN	1624	Trailer Backup Lamp Control	IV	—
D4	3	D-BU	47	Trailer Auxiliary Control	VII	—
D5 - E1	—	—	—	Not Occupied	—	—
E2	3	RD/WH	4140	Battery Positive Voltage	I	—
F1 - F2	—	—	—	Not Occupied	—	—
G1	0.8	RD/WH	640	Battery Positive Voltage	IV	—
G2	0.35	OG	2268	Windshield Washer Relay Control	V	—
G3	0.35	YE	5187	Right Trailer Turn Signal Lamp Control	V	—
G4	2	PU	92	Windshield Wiper Motor High Speed Control	VI	—
G5	2	D-GN	95	Windshield Wiper Motor Low Speed Control	VI	—
H1	—	—	—	Not Occupied	—	—
H2	0.5	RD/WH	3840	Battery Positive Voltage	III	—
H3	0.35	TN	28	Horn Relay Control	III	—
H4	0.35	PK/WH	1970	Headlamp Low Beam Relay Control	III	—
H5	0.35	PU	544	DRL Relay Control	III	—
H6	0.35	GY	91	Windshield Wiper Motor Relay Coil Control	III	—
H7	0.5	WH	5065	Stop Lamp Relay Coil Control	III	—

H8	0.35	TN	860	Front Windshield Wiper Switch High Signal	III	—
J1	1	RD/WH	640	Battery Positive Voltage	IV	—
J2	0.8	RD/WH	2940	Battery Positive Voltage	IV	—
J3	0.8	BN	2309	Front Park Lamp Control	IV	—
J4	0.8	D-BU/WH	1315	Right Front Turn Signal Lamp Control	IV	—
J5 - K2	—	—	—	Not Occupied	—	—
K3	0.8	RD/WH	2140	Battery Positive Voltage	II	—
K4	—	—	—	Not Occupied	—	—
K5	0.5	L-BU/WH	6311	Cruise/ETC/TCC Brake Signal	III	—
K6	—	—	—	Not Occupied	—	—
K7	0.8	L-BU/WH	1314	Left Front Turn Signal Lamp Control	II	—
K8	0.35	TN/WH	1969	Headlamp High Beam Relay Control	III	—

X50A Fuse Block - Underhood X4



Connector Part Information

Harness Type: Forward Lamp

OEM Connector: 15326952

Service Connector: 15306426

Description: 16-Way F 280 GT Series (BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575753	J-35616-4A (PU)	J-38125-553	15304711	Delphi 8	2	A
II	13575753	J-35616-4A (PU)	J-38125-553	15304711	Delphi 8	E	A

X50A Fuse Block - Underhood X4

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	—	—	—	Not Occupied	—	—
B	0.5	BN	2309	Front Park Lamp Control	II	—
C	0.5	BN	2309	Front Park Lamp Control	II	—
D	0.8	D-BU/WH	1315	Right Front Turn Signal Lamp Control	I	—
E	0.8	L-BU/WH	1314	Left Front Turn Signal Lamp Control	I	—
F	0.35 0.5 0.8	YE YE YE	712 712 712	Left Headlamp Low Beam Control	II II I	— — —
G - J	—	—	—	Not Occupied	—	—

G - J	—	—	—	Not Occupied	—	—
K	0.5	YE	712	Left Headlamp Low Beam Control	II	—
L	0.35	YE	712	Left Headlamp Low Beam Control	II	—
M	0.8	L-GN/BK	311	Right Headlamp High Beam Control	I	—
N	0.5	D-GN/WH	711	Left Headlamp High Beam Control	II	—
P	0.5	TN/WH	312	Right Headlamp Low Beam Control	II	—
	0.8	TN/WH	312		I	—
R - S	—	—	—	Not Occupied	—	—

X50A Fuse Block - Underhood X5

Connector Part Information

Harness Type: Battery Positive (Gas)

Harness Type: Auxiliary Battery Positive (Diesel)

OEM Connector: 15441775

Service Connector: Service by Harness – See Part Catalog

Description: Ring Terminal

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray	Core Crimp	Insulation Crimp
I	Not Available	No Tool Required	No Tool Required	Not Available	Not Available	Not Available	Not Available

X50A Fuse Block - Underhood X5

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
S	19	RD	1	Battery Positive Voltage	I	-

X50A Fuse Block - Underhood X6

Connector Part Information

Harness Type: Instrument Panel

Harness Type: LPG (KO7 with UFP)

Harness Type: LPG Front EVAP (KO7 with UFM)

OEM Connector: Not Available

Service Connector: Service by Harness – See Part Catalog

Description: Ring Terminal

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray	Core Crimp	Insulation Crimp
I	Not Available	No Tool Required	No Tool Required	Not Available	Not Available	Not Available	Not Available

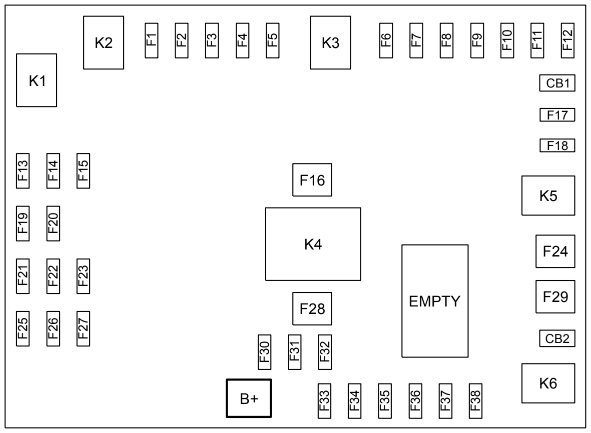
X50A Fuse Block - Underhood X6

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
S	19	RD/BK	842	Battery Positive Voltage	I	-
S	3	OG	-	Battery Positive Voltage	I	KO7 with UFP
S	0.5	RD	-	Battery Positive Voltage	I	KO7 with UFM

X52A Fuse Block - Passenger Compartment Label

MINIFUSES

F1	15A	EMPTY
F2	2A	STR/WHL/SNSR
F3	15A	AUX PRK LAMP(S) (CUTAWAY)
F4	10A	FTR PRK LAMP(S)
F5	15A	TRLR PRK LAMP(S)
F6	10A	UPFTR PRK LAMP(S)
F7	10A	RT REAR PRK LAMP
F8	10A	LT REAR PARK LAMP
F9	5A	OSRVM SW
F10	10A	AIRBAG/AOS
F11	10A	ONSTAR
F12	15A	EMPTY
F13	10A	HVAC2
F14	20A	HVAC1
F15	15A	EMPTY
F17	20A	OSRVM HTR
F18	30A	REAR DEFOG
F19	10A	CMPS
F20	15A	RDO/CHIME
F21	10A	RFA/TPM
F22	2A	IGN SW (DLIS)/PK3
F23	10A	I/P CLUSTER
F25	10A	HVAC CNTRL
F26	10A	AUX/TRLR BCK/UP
F27	10A	TAIL LAMP(S) BCK/UP
F30	15A	UPFTR CTSY LAMP(S)
F31	15A	FRT DR LCK
F32	15A	REAR DR LCK
F33	15A	CARGO DR UNLCK
F34	15A	FRT PASS DR UNLCK
F35	15A	REAR PASS DR UNLCK
F36	15A	DVR DR UNLCK
F37	15A	EMPTY
F38	15A	EMPTY


K2
F1
F2
F3
F4
F5
K3
F6
F7
F8
F9
F10
F11
F12
K1
CB1
F17
F18
F13
F14
F15
F16
K5
F19
F20
K4
F24
EMPTY
F29
F21
F22
F23
F28
F25
F26
F27
F30
F31
F32
CB2
B+
F33
F34
F35
F36
F37
F38
K6

J-CASE FUSES

F16	50A		UPFITTER AUX1
F24	30A	CART	EMPTY
F28	50A	CART	UPFITTER AUX2
F28	30A		READING LAMP(S)
F29	30A		REAR BLOWER

CIRCUIT BOARD RELAYS (NOT SHOWN)

K7	BCK/UP
K8	UPFTR CTSY LAMP(S)
K9A	FTR REAR PASS DR UNLCK
K9B	DRVR DR UNLCK
K10A	FTR REAR DR LCK
K10B	CARGO DR UNLCK

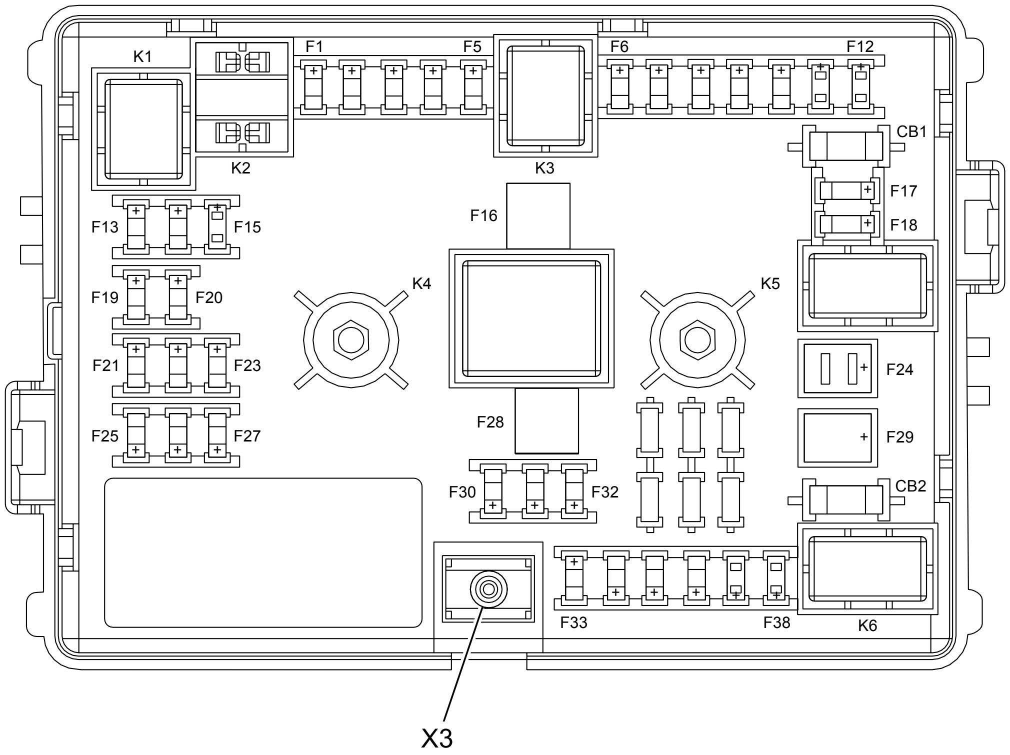
CIRCUIT BREAKERS

CB1	30A	PWR SEATS
CB2	25A	PWR WINDOW(S)

PLUG IN RELAYS

K1	(HC MICRO) RUN
K2	(HC MICRO) EMPTY
K3	PRK LAMP(S)
K4	(HC MINI) UPFTR AUX2
K5	(HC MICRO) REAR DEFOG
K6	(HC MICRO) RAP

X52A Fuse Block - Passenger Compartment Top View



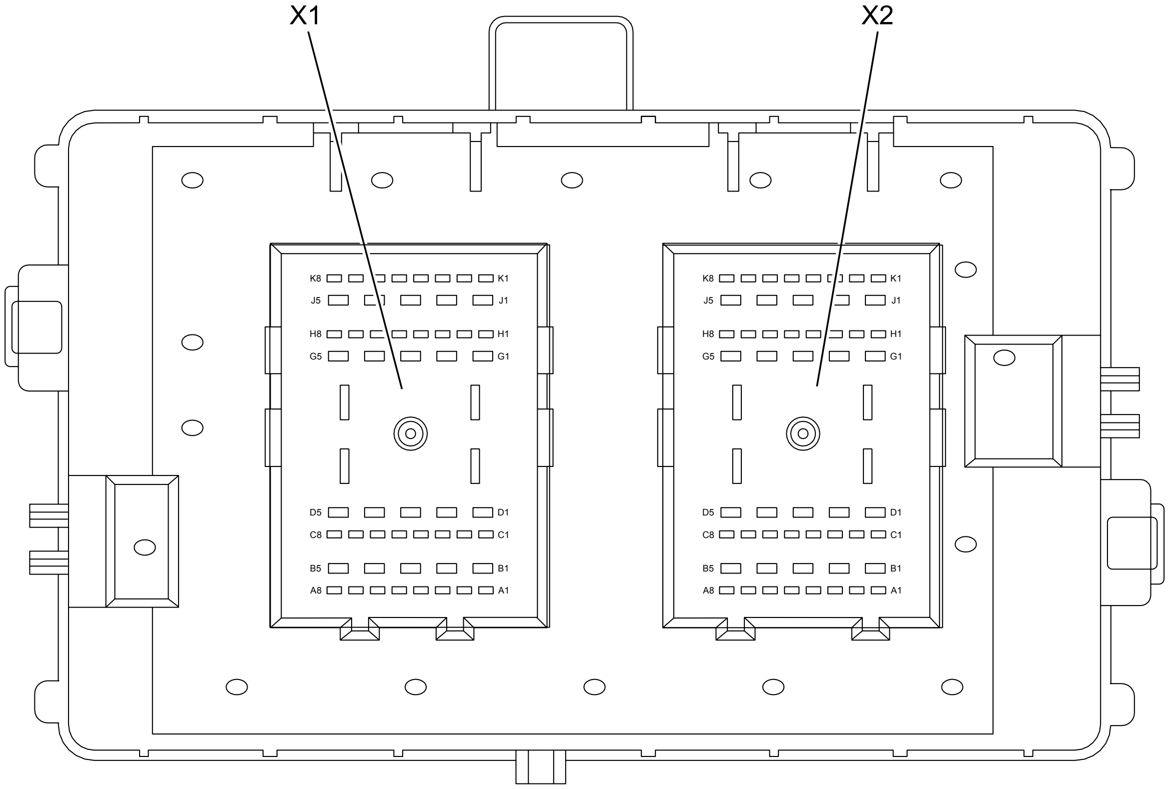
X52A Fuse Block - Passenger Compartment Usage

No.	Device Label Name	Device Assigned Name	Rating	Description
Fuses				
F1	EMPTY	F1PA	15 A	Not Used
F2	STR/WHL/SNSR	F2PA	2 A	X85 Steering Wheel Air Bag Coil (K34 or W1Y)
F3	AUX PRK LAMP(S) (CUTAWAY)	F3PA	15 A	X405 (Cutaway)
F4	FRT PRK LAMP(S)	F4PA	10 A	E2LF Side Marker Lamp - Left Front, E2RF Side Marker Lamp - Right Front, E4N Park/Turn Signal Lamp - Left, E4P Park/Turn Signal Lamp - Right
F5	TRLR PRK LAMP(S)	F5PA	15 A	X88 Trailer Connector
F6	UPFTR PRK LAMP(S)	F6PA	10 A	X320 (YF2 or YF7)
F7	RT REAR PRK LAMP	F7PA	10 A	E5T Tail/Stop and Turn Signal Lamp - Right (Cargo or Passenger)
F8	LT REAR PARK LAMP	F8PA	10 A	E5S Tail/Stop and Turn Signal Lamp - Left (Cargo or Passenger), E7 License Plate Lamp (Cargo or Passenger)
F9	OSRVM SW	F9PA	5 A	S52 Outside Rearview Mirror Switch (DEB or DE5)
F10	AIRBAG/AOS	F10PA	10 A	B60 Passenger Presence Sensor (AL0), K36 Inflatable Restraint Sensing and Diagnostic Module
F11	ONSTAR	F11PA	10 A	K73 Telematics Communication Interface Control Module (UE1)
F12	EMPTY	F12PA	15 A	Not Used
F13	HVAC2	F13PA	10 A	KR32B Blower Motor High Speed Relay - Auxiliary (C69, C36, or ENC), KR32C Blower Motor Low

F13	HVAC2	F13PA	10 A	KR32B Blower Motor High Speed Relay - Auxiliary (C69, C36, or ENC), KR32C Blower Motor Low Speed Relay - Auxiliary (C69, C36, or ENC), KR32D Blower Motor Medium Speed Relay - Auxiliary (C69, C36, or ENC), KR81 Auxiliary Battery Relay 1, M6 Air Temperature Door Actuator, M6B Air Temperature Door Actuator - Auxiliary (C69, C36, or ENC), M37B Mode Door Actuator - Auxiliary (C69, C36, or ENC), S34 HVAC Controls Switch Assembly (C49, DE5, or C60), S34F HVAC Controls Switch Assembly - Auxiliary Front, S34R HVAC Controls Switch Assembly - Auxiliary Rear (Rear HVAC Controls)
F14	HVAC1	F14PA	20 A	G34 Evaporative Emission System Leak Detection Pump (LGH), S34 HVAC Controls Switch Assembly, X81 Accessory Power Receptacle - 110V AC (KI4)
F15	EMPTY	F15PA	15 A	Not Used
F16	UPFITTER AUX1 (YF1/YF7) GAS AMBULANCE (YF2)	F16PA	50 A (YF1/YF7) 25 A (YF2)	W12 Blunt Cut - Emergency Vehicle Provision (YF1), X53A Fuse Block - Rear Body (PRP), X222 (YF7), X321 (FY7)
F17	OSRVM HTR	F17PA	20 A	A9A Outside Rearview Mirror - Driver (DEB or DE5), A9B Outside Rearview Mirror - Passenger (DEB or DE5)
F18	REAR DEFOG	F18PA	30 A	E18L Rear Defogger Grid - Left (C49), E18R Rear Defogger Grid - Right (C49)
F19	CMPS	F19PA	10 A	K18 Compass Module (U80)
F20	RDO/CHIME	F20PA	15 A	A11 Radio (Without UL5), A12 Digital Radio Receiver Control Module (U2K or UBS), P5 Chime Alarm Control Module (UL5)
F21	RFA/TPM	F21PA	10 A	K77 Remote Control Door Lock Receiver (ATG or UJM)
F22	IGN SW (DLIS)/PK3	F22PA	2 A	K64 Content Theft Deterrent Control Module, S39 Ignition Switch
F23	I/P CLUSTER	F23PA	10 A	P16 Instrument Cluster (Without 8S8)
F24	EMPTY	F24PA	30 A	Not Used
F25	HVAC CNTRL	F25PA	10 A	S34 HVAC Controls Switch Assembly (C49 or DE5)
F26	AUX/TRLR BCK/UP	F26PA	10 A	P3 Backup Alarm (8S3), X88 Trailer Connector
F27	TAIL LAMP(S) BCK/UP	F27PA	10 A	E5A Backup Lamp - Left (Cargo or Passenger), E5B Backup Lamp - Right (Cargo or Passenger)
F28	UPFITTER AUX2 (YF1/YF7) READING LAMP(S) (5B3) GAS AMBULANCE (YF2)	F28PA	50 A (YF1/YF7) 30 A (5B3) 25 A (YF2)	W12 Blunt Cut - Emergency Vehicle Provision (YF1), X222 (YF7), X321 (YF7)
F29	REAR BLOWER	F29PA	30 A	KR32B Blower Motor High Speed Relay - Auxiliary (C36, C69, or ENC), KR32C Blower Motor Low Speed Relay - Auxiliary (C36, C69, or ENC), KR32D Blower Motor Medium Speed Relay - Auxiliary (C36, C69, or ENC)
F30	UPFTR CTSY LAMP(S)	F30PA	15 A	E36AH Dome Lamp (Cargo without YF7), E37F Dome/Reading Lamps - Front (Without YF7), E37M Dome/Reading Lamps - Middle (Passenger), E37R Dome/Reading Lamps - Rear (Passenger without YF7), K9 Body Control Module, X320 (YF7), X405 (Cutaway)
F31	FRT DR LCK	F31PA	15 A	A23D Door Latch Assembly - Driver, A23P Door Latch Assembly - Passenger
F32	REAR DR LCK	F32PA	15 A	M13 Door Latch Assembly - Rear Cargo (Passenger or Cargo), M14RR Door Lock Actuator - Right Rear (E24 or YA2), X87RB Sliding Door Jamb Contact Plate - Right Body (E24 or YA2)
F33	CARGO DR UNLCK	F33PA	15 A	M13 Door Latch Assembly - Rear Cargo (Cargo or Passenger with AU3)
F34	FRT PASS DR UNLCK	F34PA	15 A	A23P Door Latch Assembly - Passenger
F35	REAR PASS DR UNLCK	F35PA	15 A	M14RR Door Lock Actuator - Right Rear (AU3), X87RB Sliding Door Jamb Contact Plate - Right Body (AU3)

				Body (AU3)
F36	DVR DR UNLCK	F36PA	15 A	A23D Door Latch Assembly - Driver (AU3)
F37	EMPTY	F37PA	15 A	Not Used
F38	EMPTY	F38PA	15 A	Not Used
CB1	PWR SEATS	CB1PA	30 A	S64D Seat Adjuster Switch - Driver (AG1), S64P Seat Adjuster Switch - Passenger (AG2)
CB2	PWR WINDOW(S)	CB2PA	25 A	S79D Window Switch - Driver (A31), S79P Window Switch - Passenger (A31)
K1	RUN	KR74 Ignition Run Relay	—	F13PA, F14PA, F19PA, KR78
K2	EMPTY	KR150 Relay - Spare	—	Not Used
K3	PRK LAMP(S)	KR53 Park Lamps Relay	—	F3PA, F4PA, F5PA, F6PA, F7PA, F8PA
K4	UPFTR AUX2	KR77 Ignition Power Provision Relay	—	W25 Blunt Cut - Configurable Provision (YF1), X222, X321 (YF7)
K5	REAR DEFOG	KR5 Rear Defogger Relay	—	A9A Outside Rearview Mirror - Driver (DEB/DE5), A9B Outside Rearview Mirror - Passenger (DEB/DE5), E18L Rear Defogger Grid - Left (C49), E18R Rear Defogger Grid - Right (C49)
K6	RAP	KR76 Retained Accessory Power Relay	—	S79D Window Switch - Driver (A31), S79P Window Switch - Passenger (A31)
K7	BCK/UP	KR40 Backup Lamp Relay	—	E5A Backup Lamp - Left, E5B Backup Lamp - Right, P3 Backup Alarm (8S3), X88 Trailer Connector, X405 (Cutaway)
K8	UPFTR CTSY LAMP(S)	KR78 Courtesy Lamps Provision Relay	—	E36AH Dome Lamp (Cargo without YF7), E37F Dome/Reading Lamps - Front (Without YF7), E37M Dome/Reading Lamps - Middle (Passenger), E37R Dome/Reading Lamps - Rear (Passenger without YF7), K9 Body Control Module, X320 (YF7), X405 (Cutaway)
K9A	FTR REAR PASS DR UNLCK	KR90P Passenger/Cargo Door Unlock Relay	—	A23P Door Latch Assembly - Passenger (AU3), M14RR Door Lock Actuator - Right Rear (AU3), KR90A Cargo Door Unlock Relay (AU3)
K9B	DRVR DR UNLCK	KR92D Driver Door Unlatch Relay	—	A23D Door Latch Assembly - Driver (AU3)
K10A	FTR REAR DR LCK	KR97 Door Lock Relay	—	A23D Door Latch Assembly - Driver, A23P Door Latch Assembly - Passenger, M13 Door Latch Assembly - Rear Cargo (Passenger or Cargo), M14RR Door Lock Actuator - Right Rear (E24 or YA2), X87RB Sliding Door Jamb Contact Plate - Right Body (E24 or YA2)
K10B	CARGO DR UNLCK	KR90A Cargo Door Unlock Relay	—	M13 Door Latch Assembly - Rear Cargo (AU3)

X52A Fuse Block - Passenger Compartment Bottom View


X1
X2
K8
K1
J5
J1
H8
H1
G5
G1
D5
D1
C8
C1
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B1
A8
A1
K8
K1
J5
J1
H8
H1
G5
G1
D5
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C8
C1
B5
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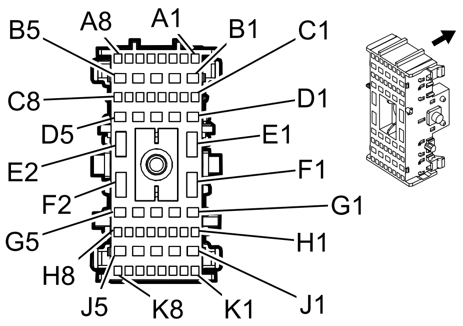
A8
A1

X52A Fuse Block - Passenger Compartment X1



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 15477823

Service Connector: 13574911

Description: 56-Way F 150, 280 GT Metri-Pack Series, (L-GY)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575465	J-35616-44 (YE)	J-38125-558	12065915	Delphi 5	C	A
II	13575718	J-35616-44 (YE)	J-38125-558	12110127	Delphi 19	F	G
III	13575735	J-35616-14 (GN)	J-38125-553	12191812	Delphi 19	C	A
IV	13575735	J-35616-14 (GN)	J-38125-553	12191812	Delphi 19	E	C
V	13575753	J-35616-4A (PU)	J-38125-553	15304711	Delphi 8	2	A
VI	13575753	J-35616-4A (PU)	J-38125-553	15304711	Delphi 8	E	A

X52A Fuse Block - Passenger Compartment X1

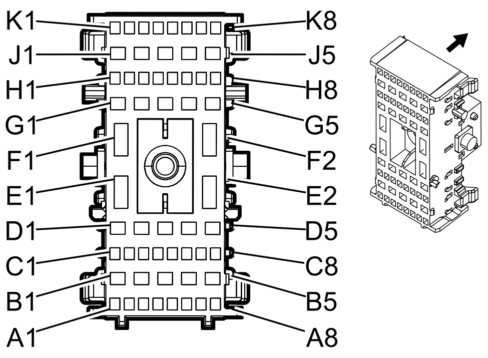
Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A1 - A3	—	—	—	Not Occupied	—	—
A4	0.5	YE	6817	LED Backlight Dimming Control	IV	—
A5	0.35	D-BU	45	Park Lamp Relay Control	IV	—
A6	0.35	BN	6136	Control	IV	—
A7 - A8	—	—	—	Not Occupied	—	—
B1	0.8	RD/WH	3240	Battery Positive Voltage	V	—

B2	1	BN	2109	Trailer Park Lamp Control	V	—
B3	0.35	BN	341	Run Ignition 3 Voltage	VI	—
B4	0.8	BN	2309	Front Park Lamp Control	V	—
B5	1	BN	2109	Trailer Park Lamp Control	V	—
C1	1	YE	618	Left Rear Turn Signal Lamp Control	III	—
C2	0.35	BN/WH	230	Instrument Panel Lamp Dimming Control	IV	—
C3	1	D-GN	619	Right Rear Turn Signal Lamp Control	III	—
C4	0.35	WH	193	Rear Defog Relay Control	IV	—
C5	0.35	BN	341	Run Ignition 3 Voltage	IV	—
C6	—	—	—	Not Occupied	—	—
C7	0.35	OG	300	Run Ignition 3 Voltage	IV	—
C8	0.8	BN	141	Run Ignition 3 Voltage	III	—
D1 - D4	—	—	—	Not Occupied	—	—
D5	0.5	D-BU	6807	DC To AC Inverter Control	VI	—
	1	BN	141	Run Ignition 3 Voltage	V	—
E1	5	RD/BK	1042	Battery Positive Voltage	II	—
E2	0.8	BK	350	Ground	I	—

F1	5	BN	541	Run Ignition 3 Voltage	II	—
F2 - G2	—	—	—	Not Occupied	—	—
G3	0.8	D-BU/WH	1315	Right Front Turn Signal Lamp Control	V	—
G4	1	RD/WH	340	Battery Positive Voltage	V	—
G5	—	—	—	Not Occupied	—	—
H1	0.8	L-BU/WH	1314	Left Front Turn Signal Lamp Control	III	—
H2	0.8 1	D-BU/WH D-BU/WH	149 149	Courtesy Lamp Control	III	— —
H3	0.35	BK/WH	351	Signal Ground	IV	—
H4	0.35	YE	43	Accessory Ignition Voltage	IV	—
H5	0.8	RD/WH	4440	Battery Positive Voltage	III	—
H6	0.35	RD/WH	2840	Battery Positive Voltage	IV	—
H7	0.35	RD/WH	540	Battery Positive Voltage	IV	—
H8	0.5	RD/WH	5340	Battery Positive Voltage	IV	—
J1 - J4	—	—	—	Not Occupied	—	—
J5	1	L-GN	1624	Trailer Backup Lamp Control	V	—
K1	—	—	—	Not Occupied	—	—
K2	0.5	YE	356	Driver Door Lock Relay Unlock Control	IV	—
K3	0.5	L-BU	244	Passenger Door Lock Switch Lock Control	IV	—

K4	0.35	L-BU	244	Passenger Door Lock Switch Lock Control	IV	—
	0.5	L-BU	244			—
K5	0.35	L-BU	244	Passenger Door Lock Switch Lock Control	IV	—
	0.5	YE	356	Driver Door Lock Relay Unlock Control		—
K6	—	—	—	Not Occupied	—	—
K7	0.5	GY/BK	690	Courtesy Lamp Relay Control	IV	—
K8	0.35	D-BU	38	Backup Lamp Relay Control	IV	—

X52A Fuse Block - Passenger Compartment X2



Connector Part Information

Harness Type: Body

OEM Connector: 15477822

Service Connector: 19115189

Description: 56-Way F 150, 280 GT Metri-Pack 800 Series (BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575718	J-35616-44 (YE)	J-38125-558	12110127	Delphi 19	F	G
II	13575735	J-35616-14 (GN)	J-38125-553	12191812	Delphi 19	C	A
III	13575735	J-35616-14 (GN)	J-38125-553	12191812	Delphi 19	E	C
IV	13575753	J-35616-4A (PU)	J-38125-553	15304711	Delphi 8	2	A
V	13575753	J-35616-4A (PU)	J-38125-553	15304711	Delphi 8	E	A
VI	13575754	J-35616-4A (PU)	J-38125-553	15304713	Delphi 19	F	D
VII	13575754	J-35616-4A (PU)	J-38125-553	Not Available	Not Available	Not Available	Not Available
VIII	13575754	J-35616-4A (PU)	J-38125-553	15304713	Delphi 19	F	D

X52A Fuse Block - Passenger Compartment X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A1	0.5	RD/WH	3440	Battery Positive Voltage	III	—
A2	—	—	—	Not Occupied	—	—
A3	0.5	RD/WH	3440	Battery Positive Voltage	III	—
A4	0.5	BN	2509	Left Rear Park Lamp Control	III	—
A5	0.5	BN	2609	Right Rear Park Lamp Control	III	—

A6	0.5	RD/WH	4340	Battery Positive Voltage	III	—
A7 - A8	—	—	—	Not Occupied	—	—
B1	3	RD/WH	3540	Battery Positive Voltage	VI	—
B2	3	RD/WH	3540	Battery Positive Voltage	VI	—
B3	1	RD/WH	3240	Battery Positive Voltage	IV	—
B4	0.5	BN	2209	Rear Park Lamp Control	V	—
B5 - C1	—	—	—	Not Occupied	—	—
C2	1	RD/WH	3240	Battery Positive Voltage	II	—
C3	0.35	BN	341	Run Ignition 3 Voltage	III	—
C4	0.35	BN	341	Run Ignition 3 Voltage	III	—
C5	0.35	BN	341	Run Ignition 3 Voltage	III	—
C6	1	D-GN	619	Right Rear Turn Signal Lamp Control	II	—
C7	1	YE	618	Left Rear Turn Signal Lamp Control	II	—
C8	0.35	BN/WH	230	Instrument Panel Lamp Dimming Control	III	—
D1	5	PU	293	Rear Defog Element Control	VIII	—
D2	5	PU	293	Rear Defog Element Control	VIII	—
D3	0.8	OG	2267	Mirror Heating Element Control	IV	—

D4	0.8	OG	2267	Mirror Heating Element Control	IV	—
D5 - E1	—	—	—	Not Occupied	—	—
E2	5	RD/BK	1042	Battery Positive Voltage	I	—
F1	5	RD/WH	1740	Battery Positive Voltage	I	—
F2	3	BN	541	Run Ignition 3 Voltage	I	—
	5	BN	541			—
G1	3	D-GN	1001	Retained Accessory Power Ignition	VI	—
G2	3	D-GN	1001	Retained Accessory Power Ignition	VI	—
G3	—	—	—	Not Occupied	—	—
G4	1	GY	295	Door Lock Actuator Lock Control	IV	—
G5	0.8	GY	295	Door Lock Actuator Lock Control	VII	—
	1	GY	295		IV	—
H1	—	—	—	Not Occupied	—	—
H2	0.35	BN	441	Run Ignition 3 Voltage	III	—
H3	0.35	BK/WH	351	Signal Ground	III	—
H4	—	—	—	Not Occupied	—	—
H5	0.5	D-BU/WH	1315	Right Front Turn Signal Lamp Control	III	—
H6	0.5	L-BU/WH	1314	Left Front Turn Signal Lamp Control	III	—

H7	0.5	D-BU/WH	149	Courtesy Lamp Control	III	—
H8	0.5	D-BU/WH	149	Courtesy Lamp Control	III	—
	0.8	D-BU/WH	149		II	—
	1	D-BU/WH	149		II	—
J1	0.8	TN	694	Driver Door Lock Actuator Unlock Control	IV	—
J2	1	TN	294	Door Lock Actuator Unlock Control	IV	—
J3	0.8	TN	294	Door Lock Actuator Unlock Control	VII	—
	0.8	TN	294		IV	—
J4	0.8	TN	294	Door Lock Actuator Unlock Control	IV	—
J5	0.8	GY	295	Door Lock Actuator Lock Control	VII	—
K1 - K2	—	—	—	Not Occupied	—	—
K3	1	TN/BK	1095	Right Rear Door Lock Actuator Unlock Control	II	—
K4 - K6	—	—	—	Not Occupied	—	—
K7	1	TN	294	Door Lock Actuator Unlock Control	II	—
K8	1	L-GN	24	Backup Lamp Control	II	—

Connector Part Information

Harness Type: Instrument Panel

OEM Connector: Not Available

Service Connector: Service by Harness – See Part Catalog

Description: Ring Terminal

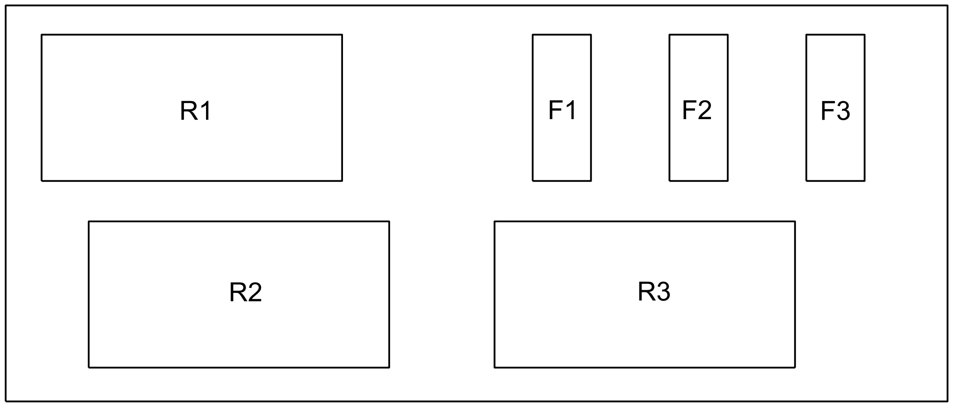
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray	Core Crimp	Insulation Crimp
I	Not Available	No Tool Required	No Tool Required	Not Available	Not Available	Not Available	Not Available

X52A Fuse Block - Passenger Compartment X3

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
S	19	RD	842	Battery Positive Voltage	I	-

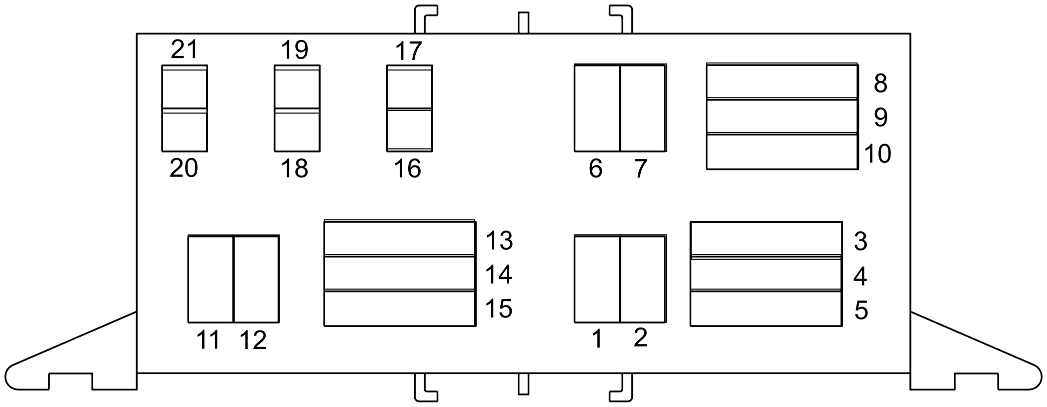
X53A Fuse Block - Rear Body Top View (PRP)



X53A Fuse Block - Rear Body Usage

No.	Device Label Name	Device Assigned Name	Rating	Description
Fuses				
F1	DOME FLUORESCENT WORK LAMPS	F1RA	10 A	E21A Fluorescent Work Lamp - Right Access Panel, E21F Fluorescent Work Lamp - Front Cargo, E21LF Fluorescent Work Lamp - Left Front Access Panel, E21R Fluorescent Work Lamp - Rear Cargo, E21LR Fluorescent Work Lamp - Left Rear Access Panel
F2	PANEL ACTUATOR	F2RA	15 A	KR89LF Left Front Access Panel Relay, KR89LR Left Rear Access Panel Relay, KR89RR Right Rear Access Panel Relay
F3	SPARE	F3RA	—	Not Used
Relays				
R1	LEFT REAR ACCESS PANEL RELAY	KR89LR Left Rear Access Panel Relay	—	M2C Access Panel Unlatch Actuator - Left Rear Side Front, M2D Access Panel Unlatch Actuator - Left Rear Side Rear
R2	LEFT FRONT ACCESS PANEL RELAY	KR89LF Left Front Access Panel Relay	—	M2A Access Panel Unlatch Actuator - Left Front Side Front, M2B Access Panel Unlatch Actuator - Left Front Side Rear
R3	RIGHT REAR ACCESS PANEL RELAY	KR89RR Right Rear Access Panel Relay	—	M2E Access Panel Unlatch Actuator - Right Side Front, M2F Access Panel Unlatch Actuator - Right Side Rear

X53A Fuse Block - Rear Body Bottom View (PRP)



Connector Part Information

Harness Type: Side Access Panel Harness

OEM Connector: Not Available

Service Connector: Not Available

Description: 21-Way F Fuse Block (BK)

Terminal Part Information

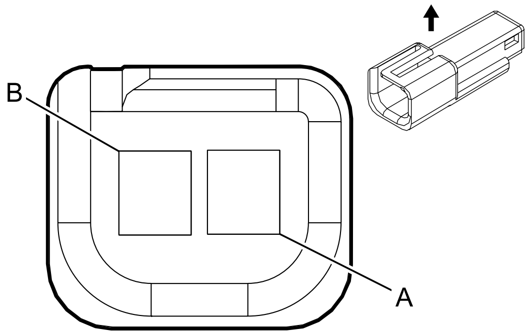
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray	Core Crimp	Insulation Crimp
I	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available

X53A Fuse Block - Rear Body Bottom View (PRP)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.8	OG	740	Battery Positive Voltage	I	—
2	0.8	TN	294	Door Lock Actuator Unlock Control	I	—
3	0.5	L-BU/WH	244	Passenger Door Lock Switch Lock Control	I	—
4	—	—	—	Not Used	—	—
5	0.5	OG	5810	Park Enable Signal	I	—
6	0.8	OG	740	Battery Positive Voltage	I	—
7	0.8	PK	1092	Left Rear Door Lock Actuator Unlock Control	I	—
8	0.5	L-GN	1391	Left Front Door Lock Relay Control	I	—
9	—	—	—	Not Used	—	—
10	0.5	OG	5810	Park Enable Signal	I	—
11	0.8	OG	740	Battery Positive Voltage	I	—
12	0.8	TN/BK	1095	Right Rear Door Lock Actuator Unlock Control	I	—

13	0.5	L-BU	1344	Trunk Release Relay Control	I	—
14	—	—	—	Not Used	—	—
15	0.5	OG	5810	Park Enable Signal	I	—
16	0.8	RD	1732	Electronic Control Unit 12 Volt Reference (3)	I	UF2
17	0.8	D-BU/WH	149	Courtesy Lamp Supply Voltage	I	UF2
18	5.0	RD	1042	Battery Positive Voltage	I	—
19	1.0	OG	740	Battery Positive Voltage	I	—
20	—	—	—	Not Used	—	—
21	—	—	—	Not Used	—	—

A3R Sunshade - Right



Connector Part Information

Harness Type: Headliner

OEM Connector: 12047663

Service Connector: 13584278

Description: 2-Way M 150 Metri-Pack Series (BK)

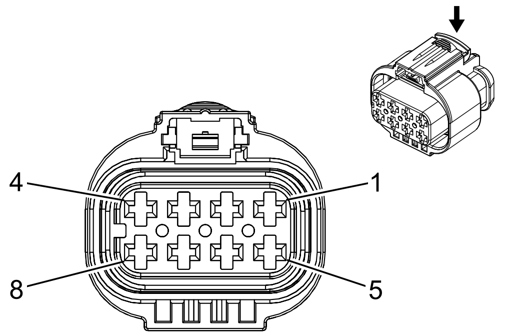
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-3 (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required

A3R Sunshade - Right

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	OG	1732	Electronic Control Unit 12V Reference 3	I	—
B	0.5	BK	1850	Ground	I	—

A7 Fuel Pump and Level Sensor Assembly



Connector Part Information

Harness Type: Chassis

OEM Connector: 33180017

Service Connector: 13588283

Description: 8-Way F 2.8 Series, Sealed (BK)

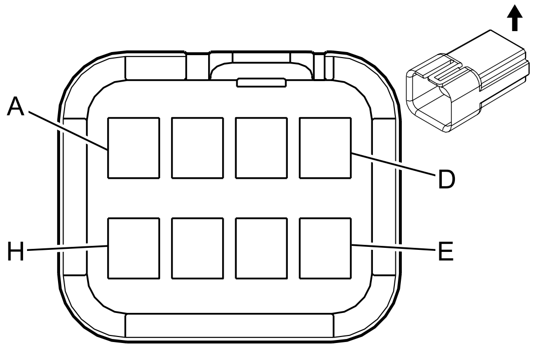
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-35 (VT)	No Tool Required	Not Required	Not Required	Not Required	Not Required

A7 Fuel Pump and Level Sensor Assembly

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1 - 2	—	—	—	Not Occupied	—	—
3	2.5	GY	120	Fuel Pump Control	I	—
4	2.5	BK/L-GN	1580	Fuel Pump Low Reference	I	—
5	0.5	PU	1589	Primary Fuel Level Sensor Signal	I	—
6	0.5	TN	2759	Fuel Tank Pressure Sensor Low Reference	I	—
7 - 8	—	—	—	Not Occupied	—	—

A9A Outside Rearview Mirror - Driver



Connector Part Information

Harness Type: Driver Door

OEM Connector: 12065396

Service Connector: Service by Harness - See Part Catalog

Description: 8-Way M 150 Metri-Pack Series (NA)

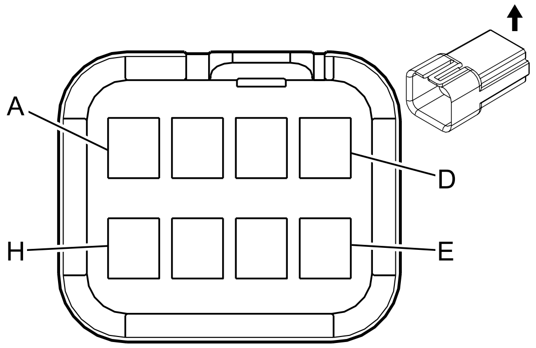
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-3 (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required

A9A Outside Rearview Mirror - Driver

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	BK	450	Ground	I	—
B	0.5	L-BU/WH	1314	Left Front Turn Signal Lamp Control	I	—
C	0.8	OG	2267	Mirror Heating Element Control	I	—
D	0.5	BK	450	Ground	I	—
E	0.35	YE	88	Left Mirror Motor Up Control	I	—
F	0.35	L-GN	89	Left Mirror Motor Down Control	I	—
G	0.35	WH	81	Left Mirror Motor Right Control	I	—
H	0.35	YE	88	Left Mirror Motor Up Control	I	—

A9B Outside Rearview Mirror - Passenger



Connector Part Information

Harness Type: Passenger Door

OEM Connector: 12162427

Service Connector: Service by Harness - See Part Catalog

Description: 8-Way M 150 Metri-Pack Series (NA)

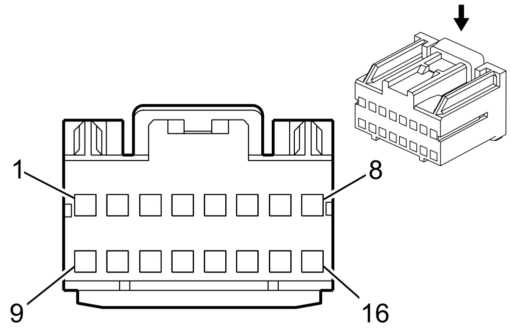
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-3 (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required

A9B Outside Rearview Mirror - Passenger

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	BK	1850	Ground	I	—
B	0.5	D-BU/WH	1315	Right Front Turn Signal Lamp Control	I	—
C	0.8	OG	2267	Mirror Heating Element Control	I	—
D	0.5	BK	1850	Ground	I	—
E	0.35	BN/WH	1498	Right Mirror Motor Up Control	I	—
F	0.35	PU/WH	889	Right Mirror Motor Down Control	I	—
G	0.35	OG/WH	881	Right Mirror Motor Right Control	I	—
H	0.35	BN/WH	1498	Right Mirror Motor Up Control	I	—

A10 Inside Rearview Mirror



Connector Part Information

Harness Type: Headliner

OEM Connector: 15441350

Service Connector: 15306351

Description: 16-Way F 100A Micro-Pack Series (BK)

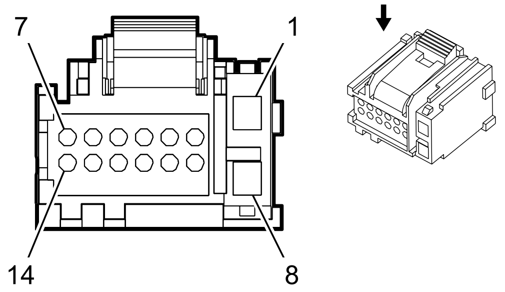
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575548	J-35616-16 (LT GN)	J-38125-559	15445905	Delphi 23	J	J

A10 Inside Rearview Mirror

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1 - 5	—	—	—	Not Occupied	—	—
6	0.5	WH	7641	Camera Rear Vision Signal +	I	—
7	0.5	BU	7642	Camera Rear Vision Signal (-)	I	—
8	0.5	BK/WH	351	Signal Ground	I	—
9	0.5	L-GN	24	Backup Lamp Control	I	—
10 - 12	—	—	—	Not Occupied	—	—
13	0.5	PK	239	Run/Crank Ignition 1 Voltage	I	—
14 - 16	—	—	—	Not Occupied	—	—

A11 Radio X1



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 13545675

Service Connector: 13580448

Description: 14-Way F 0.64 Micro-Pack, 150 GT Series (BK)

Terminal Part Information

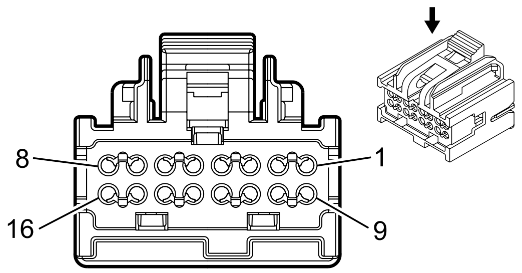
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575535	J-35616-64B (LT BU)	J-38125-21	15359541	Delphi 4	M	M
II	13575735	J-35616-14 (GN)	J-38125-553	12191812	Delphi 19	C	A
III	13579976	J-35616-64B (LT BU)	J-38125-21	15359541	Delphi 4	M	M

A11 Radio X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	1	RD/WH	340	Battery Positive Voltage	II	—
2	0.8	D-BU	1857	Left Front Midrange Speaker Control (+)	III	—
3	0.8	OG	1853	Right Front Midrange Speaker Control (+)	III	—
4	0.35 0.8	PK GY	5149 655	Voice Recognition Audio Signal Cellular Telephone Microphone Signal	I III	UI8+UE1 UI8-UE1
5	0.35 0.8	PK/BK D-GN	5152 654	Voice Recognition Audio Low Reference Cellular Telephone Microphone Low Reference	I III	UI8+UE1 UI8-UE1
6	—	—	—	Not Occupied	—	—

6	—	—	—	Not Occupied	—	—
7	0.35	YE	6817	LED Backlight Dimming Control	I	—
8	1	BK/WH	351	Signal Ground	II	—
9	0.8	L-BU	1957	Left Front Midrange Speaker (-) Low Reference	III	—
10	0.8	D-GN	1953	Right Front Midrange Speaker (-) Low Reference	III	—
11 - 12	—	—	—	Not Occupied	—	—
13	0.35	D-GN	5060	Low Speed GMLAN Serial Data	I	—
14	—	—	—	Not Occupied	—	—

A11 Radio X2



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 13567860

Service Connector: 13504130

Description: 16-Way F 64 Micro-Series, Sealed (PU)

Terminal Part Information

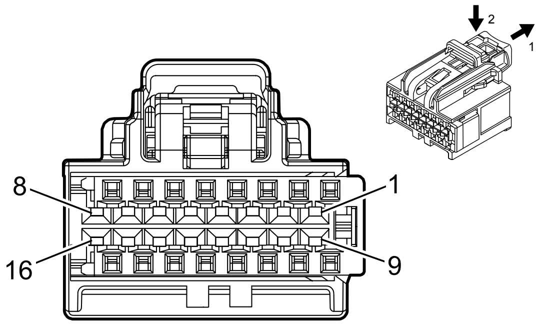
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575535	J-35616-64B (LT BU)	J-38125-21	15359541	Delphi 4	M	M
II	13579976	J-35616-64B (LT BU)	J-38125-21	15359541	Delphi 4	M	M

A11 Radio X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.35	BN/WH	367	Remote Radio Left Audio Signal	I	—
2	0.35	D-GN/WH	368	Remote Radio Right Audio Signal 1	I	—
3 - 4	—	—	—	Not Occupied	—	—
5	0.8	TN	1859	Left Rear Midrange Speaker Control (+)	II	—
6	0.8	TN	1855	Right Rear Midrange Speaker Control (+)	II	—
7	0.8	D-BU	658	Cellular Telephone Voice Signal	II	UE1-UL5-UI8
	0.35	D-BU	658	Cellular Telephone Voice Signal	I	UI8+UE1
8	—	—	—	Not Occupied	—	—
9	0.35	TN/WH	372	Remote Radio Audio (-) Low Reference	I	—

9	0.35	TN/WH	372	Remote Radio Audio (-) Low Reference	I	—
10	0.35	GY	388	Remote Radio Right Audio Signal 2	I	—
11 - 12	—	—	—	Not Occupied	—	—
13	0.8	WH	1959	Left Rear Midrange Speaker (-) Low Reference	II	—
14	0.8	OG	1955	Right Rear Midrange Speaker (-) Low Reference	II	—
15	0.8	L-BU/BK	659	Cellular Telephone Voice Low Reference	II	UE1-UL5-UI8
	0.35	L-BU/BK	659	Cellular Telephone Voice Low Reference	I	UI8+UE1
16	—	—	—	Not Occupied	—	—

A11 Radio X4



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 33104226

Service Connector: 13594067

Description: 16-Way F 0.64 OCS Series (BN)

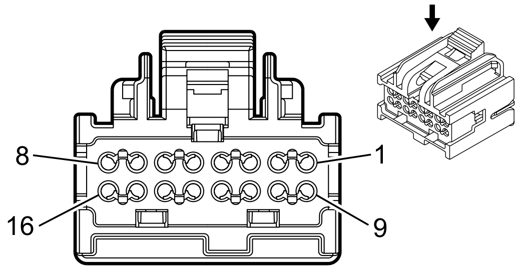
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	19300660	J-35616-64B (LT BU)	J-38125-12A	Not Available	Not Available	Not Available	Not Available

A11 Radio X4

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1 - 5	—	—	—	Not Occupied	—	—
6	0.35	WH	7641	Camera Rear Vision Signal +	I	—
7	0.35	L-BU	7642	Camera Rear Vision Signal (-)	I	—
8 - 16	—	—	—	Not Occupied	—	—

A12 Digital Radio Receiver Control Module



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 13568238

Service Connector: 13504130

Description: 16-Way F 64 Micro-Series, Sealed (BK)

Terminal Part Information

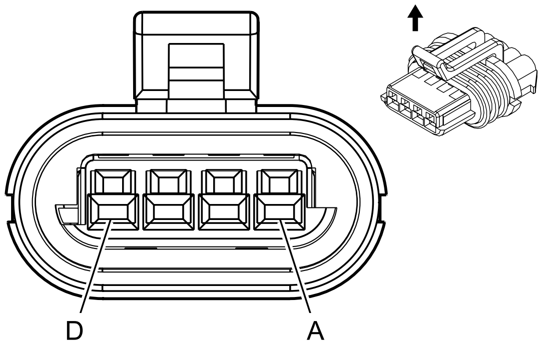
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575535	J-35616-64B (LT BU)	J-38125-21	15359541	Delphi 4	M	M
II	13579976	J-35616-64B (LT BU)	J-38125-21	15359541	Delphi 4	M	M

A12 Digital Radio Receiver Control Module

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.35	TN/WH	372	Remote Radio Audio (-) Low Reference	I	—
2	0.35	BN/WH	367	Remote Radio Left Audio Signal	I	—
3	0.35	D-GN/WH	368	Remote Radio Right Audio Signal 1	I	—
4	0.35	GY	388	Remote Radio Right Audio Signal 2	I	—
5	0.5	D-GN	5060	Low Speed GMLAN Serial Data	II	—
6 - 8	—	—	—	Not Occupied	—	—
9	0.8	BK/WH	351	Signal Ground	II	—
10	—	—	—	Not Occupied	—	—

11	0.35	BARE	1573	Front Audio Low Reference	I	—
12 - 15	—	—	—	Not Occupied	—	—
16	0.8	RD/WH	340	Battery Positive Voltage	II	—

A23D Door Latch Assembly - Driver X1



Connector Part Information

Harness Type: Driver Door

OEM Connector: 15354716

Service Connector: Service by Harness - See Part Catalog

Description: 4-Way F 150 GT Series, Sealed (BK)

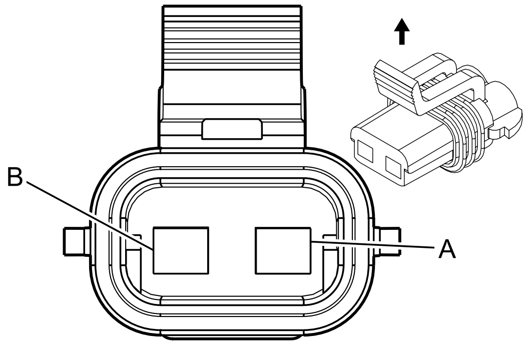
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

A23D Door Latch Assembly - Driver X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.35	TN	126	Left Front Door Open Switch Signal	I	—
B	0.35	GY/BK	745	Left Front Door Ajar Switch Signal	I	—
C	—	—	—	Not Occupied	—	—
D	0.35	BK	450	Ground	I	—

A23D Door Latch Assembly - Driver X2



Connector Part Information

Harness Type: Driver Door

OEM Connector: 15300027

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F 280 Metri-Pack Series, Sealed (BK)

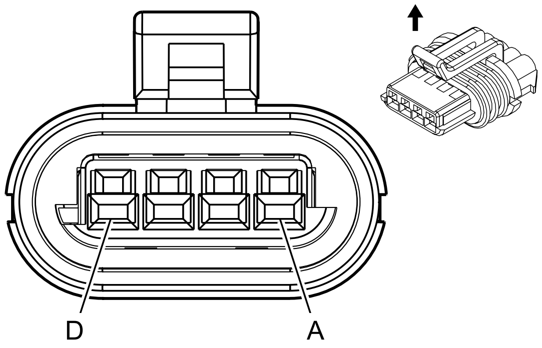
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

A23D Door Latch Assembly - Driver X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	TN	694	Driver Door Lock Actuator Unlock Control	I	—
B	0.8	GY	295	Door Lock Actuator Lock Control	I	—

A23P Door Latch Assembly - Passenger X1



Connector Part Information

Harness Type: Passenger Door

OEM Connector: 15354716

Service Connector: Service by Harness - See Part Catalog

Description: 4-Way F 150 GT Series, Sealed (BK)

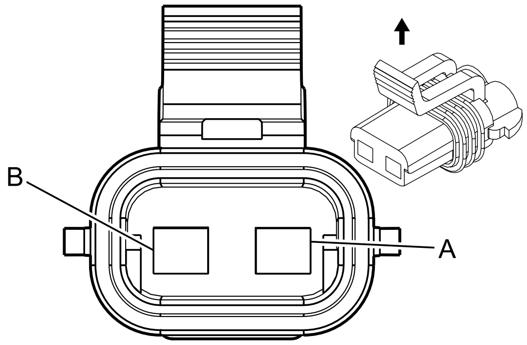
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

A23P Door Latch Assembly - Passenger X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.35	BK	1850	Ground	I	—
B	—	—	—	Not Occupied	—	—
C	0.35	TN/WH	746	Right Front Door Ajar Switch Signal	I	—
D	0.35	L-GN	1177	Right Front Door Open Switch Signal	I	—

A23P Door Latch Assembly - Passenger X2



Connector Part Information

Harness Type: Passenger Door

OEM Connector: 15300027

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F 280 Metri-Pack Series, Sealed (BK)

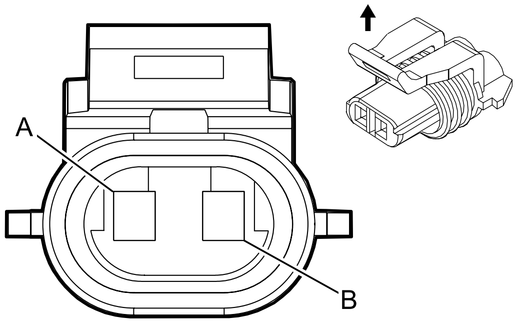
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

A23P Door Latch Assembly - Passenger X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	TN	294	Door Lock Actuator Unlock Control	I	—
B	0.8	GY	295	Door Lock Actuator Lock Control	I	—

B1B A/C Low Side Pressure Switch



Connector Part Information

Harness Type: Engine

OEM Connector: 12052644

Service Connector: 15306302

Description: 2-Way F 150 Metri-Pack Series, Sealed (GY)

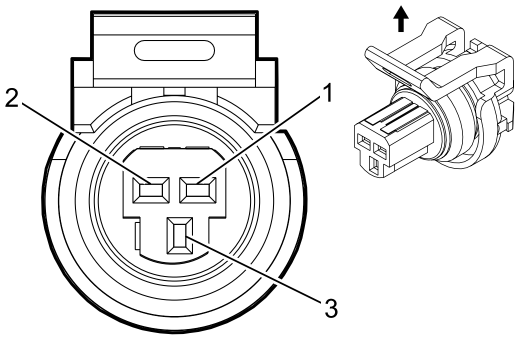
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B1B A/C Low Side Pressure Switch

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.5	L-GN	66	A/C Request Signal	I	—
B	0.5	L-GN/WH	66	A/C Request Signal	I	—

B1 A/C Refrigerant Pressure Sensor



Connector Part Information

Harness Type: Engine

OEM Connector: 13532244

Service Connector: 88988301

Description: 3-Way F 150 GT Series, Sealed (BK)

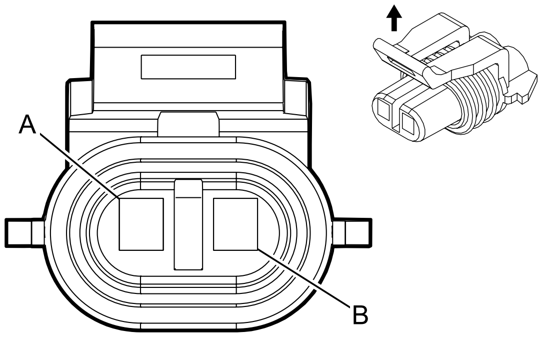
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B1 A/C Refrigerant Pressure Sensor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.8	TN	5514	A/C Refrigerant Pressure Sensor Low Reference	I	—
2	0.8	GY	2700	A/C Pressure Sensor 5V Reference	I	—
3	0.8	OG/BK	380	A/C Refrigerant Pressure Sensor Signal	I	—

B5LF Wheel Speed Sensor - Left Front



Connector Part Information

Harness Type: Chassis

OEM Connector: 12052641

Service Connector: 13586114

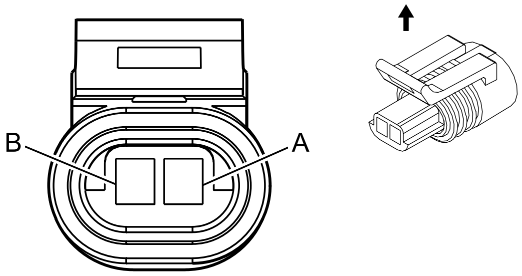
Description: 2-Way F 150 Metri-Pack Series (BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B5LF Wheel Speed Sensor - Left Front

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.5	YE	873	Left Front Wheel Speed Sensor Low Reference	I	—
B	0.5	L-BU	830	Wheel Speed Sensor Signal Left Front	I	—



Connector Part Information

Harness Type: Wheel Speed Sensor

OEM Connector: 12162193

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F 150.2 Metri-Pack Series, Sealed (BK)

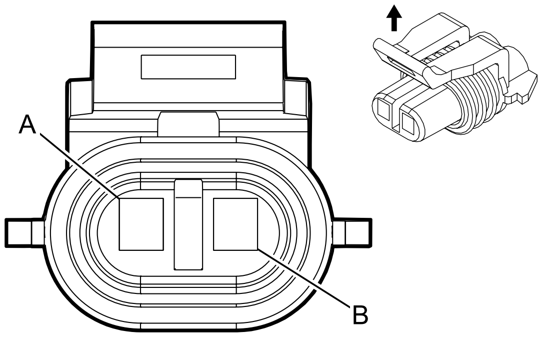
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B5LR Wheel Speed Sensor - Left Rear

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.5	BK	884	Wheel Speed Sensor Signal Left Rear	I	—
B	0.5	RD	885	Wheel Speed Sensor Low Reference Left Rear	I	—

B5RF Wheel Speed Sensor - Right Front



Connector Part Information

Harness Type: Chassis

OEM Connector: 12052641

Service Connector: 13586114

Description: 2-Way F 150 Metri-Pack Series (BK)

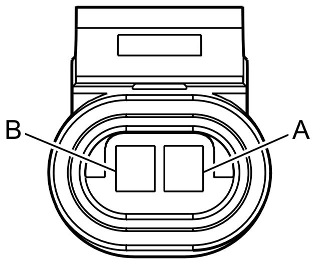
Terminal Part Information

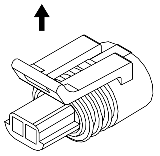
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B5RF Wheel Speed Sensor - Right Front

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.5	TN	833	Wheel Speed Sensor Low Reference Right Front	I	—
B	0.5	D-GN	872	Wheel Speed Sensor Signal Right Front	I	—

B5RR Wheel Speed Sensor - Right Rear





Connector Part Information

Harness Type: Right Rear Wheel Speed Sensor Jumper

OEM Connector: 12162193

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F 150.2 Metri-Pack Series, Sealed (BK)

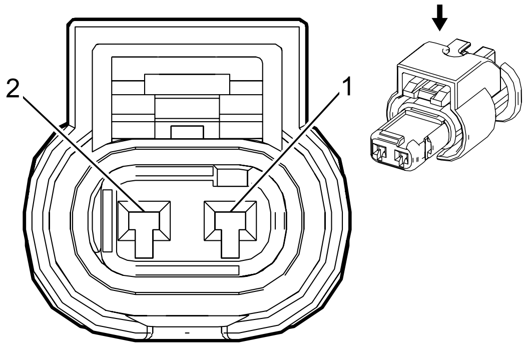
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B5RR Wheel Speed Sensor - Right Rear

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.5	WH	883	Wheel Speed Sensor Low Reference Right Rear	I	—
B	0.5	BN	882	Wheel Speed Sensor Signal Right Rear	I	—

B9 Ambient Air Temperature Sensor (LWN)



Connector Part Information

Harness Type: Forward Lamp

OEM Connector: 13927761

Service Connector: 19300402

Description: 2-Way F 1.2 MCP Series, Sealed (BK)

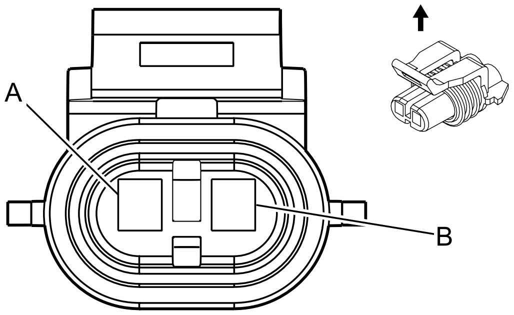
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-64B (LT BU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B9 Ambient Air Temperature Sensor (LWN)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	L-GN/BK	735	Outside Ambient Air Temperature Sensor Signal	I	—
2	0.5	BK/YE	407	Sensor Low Reference	I	—

B9 Ambient Air Temperature Sensor (UFA)



Connector Part Information

Harness Type: Forward Lamp

OEM Connector: 12052642

Service Connector: 12101856

Description: 2-Way F 150 Metri-Pack Series, Sealed (L-GN)

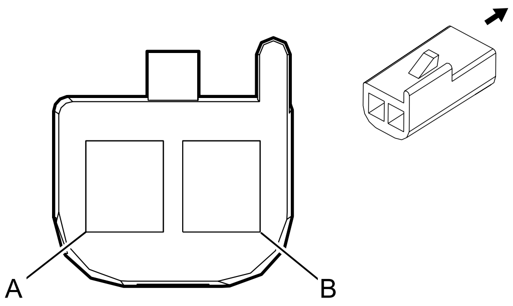
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B9 Ambient Air Temperature Sensor (UFA)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.5	D-GN/WH	636	Outside Ambient Air Temperature Sensor Signal	I	—
B	0.5	YE	61	Outside Ambient Temperature Sensor Low Reference	I	—

B10 Ambient Light Sensor



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 12047662

Service Connector: 12085535

Description: 2-Way F 150 Metri-Pack Series (BK)

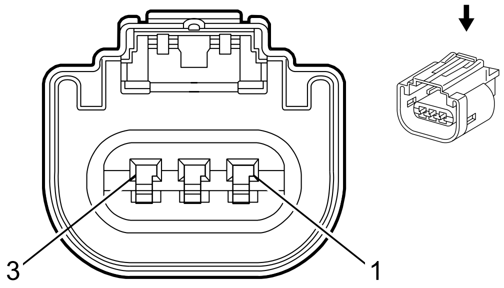
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B10 Ambient Light Sensor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.35	WH	278	Ambient Light Sensor Signal	I	—
B	0.35	BK/WH	351	Signal Ground	I	—

B18 Battery Current Sensor



Connector Part Information

Harness Type: Engine

OEM Connector: 13835946

Service Connector: 19179750

Description: 3-Way F 1.5 Series, Sealed (BK)

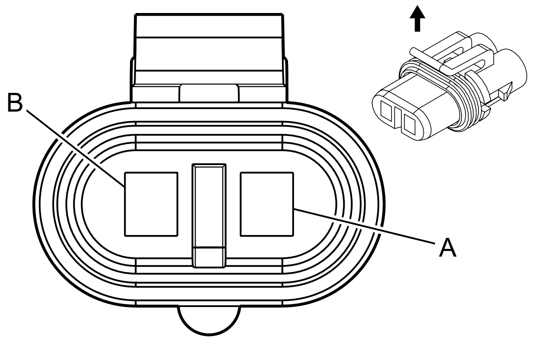
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-2A (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B18 Battery Current Sensor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	PK	5076	Current Sensor Control	I	—
2	0.5	BN	5077	Current Sensor Low Reference	I	—
3	0.5	WH	5075	Current Sensor Signal	I	—

B19A Brake Booster Fluid Pressure Alarm Switch



Connector Part Information

Harness Type: Brake Fluid Level Switch

OEM Connector: 12020599

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F 280 Metri-Pack Series, Sealed (BK)

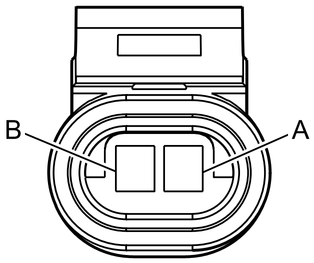
Terminal Part Information

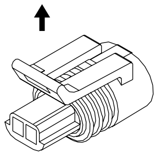
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B19A Brake Booster Fluid Pressure Alarm Switch

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.5	TN/WH	33	Brake Warning Indicator Control	I	—
B	0.5	L-BU/BK	1928	Brake Booster Fluid Flow Switch Signal	I	—

B20 Brake Fluid Level Switch





Connector Part Information

Harness Type: Engine

OEM Connector: 12162193

Service Connector: 88987993

Description: 2-Way F 150.2 Metri-Pack Series, Sealed (BK)

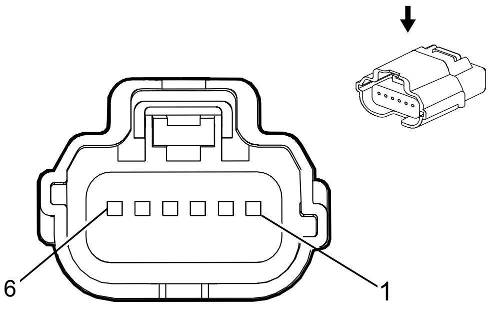
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B20 Brake Fluid Level Switch

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.5	BK/WH	1551	Signal Ground	I	—
B	0.5	PU	333	Brake Fluid Level Sensor Signal	I	—

B22 Brake Pedal Position Sensor



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 13893502

Service Connector: 13577043

Description: 6-Way F 64 Series, Sealed (NA)

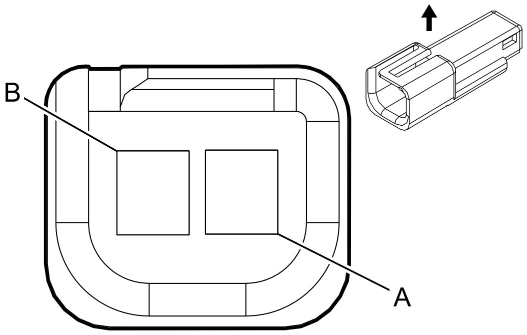
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-64B (LT BU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B22 Brake Pedal Position Sensor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	BN/WH	5382	Brake Position Sensor Low Reference	I	—
2	0.5	GY	5381	Brake Position Sensor 5V Reference	I	—
3	0.5	TN	5380	Brake Position Sensor Signal	I	—
4	0.5	YE	5361	Brake Apply Sensor Signal	I	—
5	0.5	BN	5360	Brake Apply Sensor Low Reference	I	—
6	0.5	WH	5359	Brake Apply Sensor Control	I	—

B24 Cellular Phone Microphone



Connector Part Information

Harness Type: Headliner

OEM Connector: 12047663

Service Connector: 13584278

Description: 2-Way M 150 Metri-Pack Series (BK)

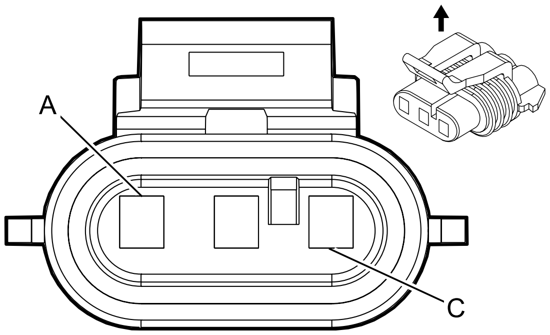
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-3 (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B24 Cellular Phone Microphone

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	D-GN	654	Cellular Telephone Microphone Low Reference	I	—
B	0.8	GY	655	Cellular Telephone Microphone Signal	I	—

B26 Crankshaft Position Sensor



Connector Part Information

Harness Type: Engine

OEM Connector: 12129946

Service Connector: 88987997

Description: 3-Way F 150 Metri-Pack Series, Sealed (GY)

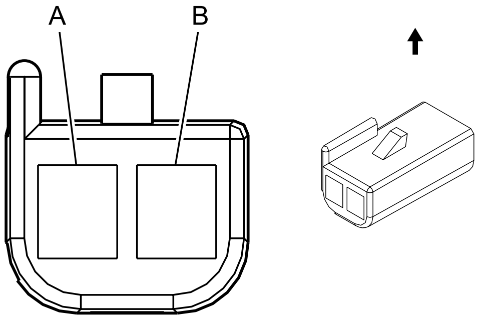
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B26 Crankshaft Position Sensor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	WH/BK	6271	Crankshaft 60X Sensor Signal	I	—
B	0.8	GY/BK	6272	Crankshaft 60X Sensor Low Reference	I	—
C	0.8	PU/WH	6270	Crankshaft 60X Sensor 5V Reference	I	—

B28F Door Ajar Switch - Right Sliding



Connector Part Information

Harness Type: Body

OEM Connector: 12059251

Service Connector: 12101848

Description: 2-Way F 150 Metri-Pack Series (RD)

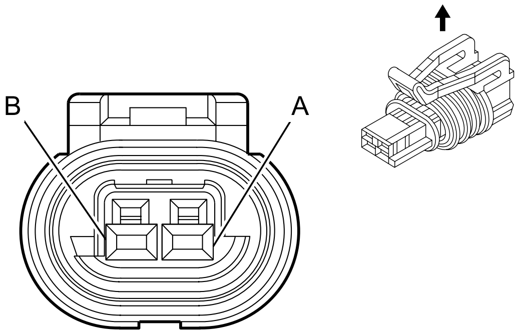
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B28F Door Ajar Switch - Right Sliding

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.35	BK	1850	Ground	I	—
B	0.35	YE/BK	1181	Right Rear Door Open Switch Signal	I	—

B34 Engine Coolant Temperature Sensor



Connector Part Information

Harness Type: Engine

OEM Connector: 15449028

Service Connector: 88987993

Description: 2-Way F 150 GT Series, Sealed (BK)

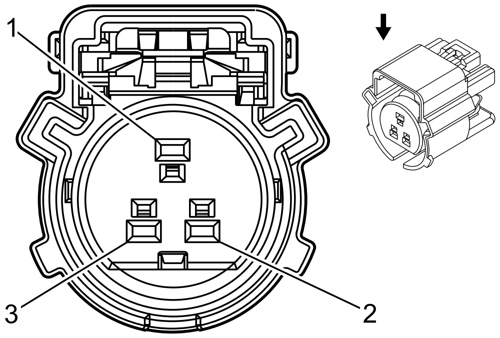
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B34 Engine Coolant Temperature Sensor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	TN	2761	Coolant Temperature Sensor Low Reference	I	—
B	0.8	YE	410	Engine Coolant Temperature Sensor Signal	I	—

B37B Engine Oil Pressure Sensor



Connector Part Information

Harness Type: Engine

OEM Connector: 13589761

Service Connector: 13501882

Description: 3-Way F 150 GT Series, Sealed (BK)

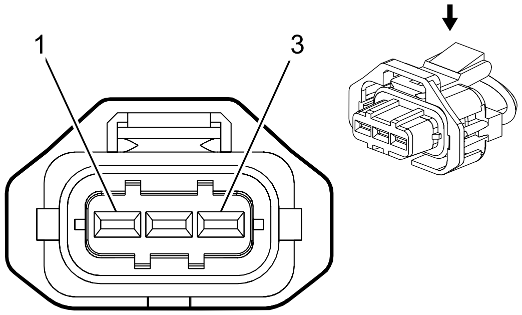
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B37B Engine Oil Pressure Sensor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.8	TN/WH	331	Oil Pressure Sensor Signal	I	—
2	0.8	GY	2705	Oil Pressure Sensor 5V Reference	I	—
3	0.8	BK	2755	Oil Pressure Sensor Low Reference	I	—

B47B Fuel Rail Pressure Sensor (LGH)



Connector Part Information

Harness Type: Engine

OEM Connector: 1928403968

Service Connector: 13584311

Description: 3-Way F 2.8 Series, Sealed (BK)

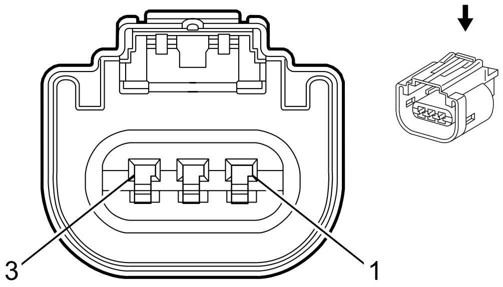
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-35 (VT)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B47B Fuel Rail Pressure Sensor (LGH)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	OG/BK	2919	Fuel Rail Pressure Sensor Low Reference	I	LML/LGH
2	0.5	YE	2918	Fuel Rail Pressure Sensor Signal	I	LML/LGH
3	0.5	TN	2917	Fuel Rail Pressure Sensor 5V Reference	I	LML/LGH

B47 Fuel Pressure Sensor (-335/LGH/LWN)



Connector Part Information

Harness Type: Chassis

OEM Connector: 13835946

Service Connector: 19179750

Description: 3-Way F 1.5 Series, Sealed (BK)

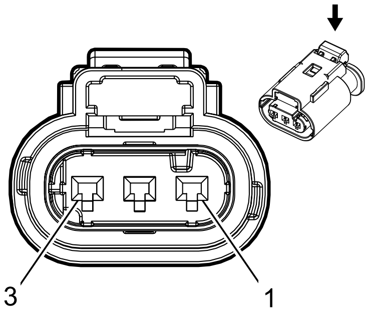
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-2A (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B47 Fuel Pressure Sensor (-335/LGH/LWN)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	PU	7446	Fuel Line Pressure Sensor Signal	I	—
2	0.5	GY	7447	Fuel Line Pressure Sensor Low Reference	I	—
3	0.5	BN	7445	Fuel Line Pressure Sensor 5V Reference	I	—

B47 Fuel Pressure Sensor (335-LGH/LWN)



Connector Part Information

Harness Type: Chassis

OEM Connector: 13763990

Service Connector: 19299690

Description: 3-Way F 1.2 Multilock Series, Sealed (BK)

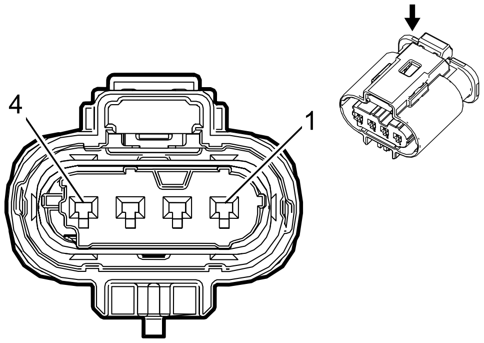
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-16 (LT GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B47 Fuel Pressure Sensor (335-LGH/LWN)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	BN	7445	Fuel Line Pressure Sensor 5V Reference	I	—
2	0.5	GY	7447	Fuel Line Pressure Sensor Low Reference	I	—
3	0.5	PU	7446	Fuel Line Pressure Sensor Signal	I	—

B52C Heated Oxygen Sensor - Bank 1 Sensor 1



Connector Part Information

Harness Type: Engine

OEM Connector: 13869004

Service Connector: 19301716

Description: 4-Way F 1.2 Multilock Series, Sealed (D-GY)

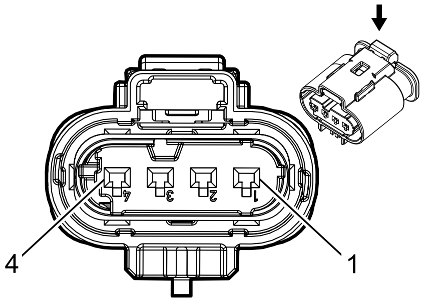
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-16 (LT GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B52C Heated Oxygen Sensor - Bank 1 Sensor 1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.8	GY/WH	3113	Heated Oxygen Sensor Heater Low Control Bank 1 Sensor 1	I	—
2	0.8	PK	539	Run/Crank Ignition 1 Voltage	I	—
3	0.8	TN	1664	Heated Oxygen Sensor Low Signal Bank 1 Sensor 1	I	—
4	0.8	PU/WH	1665	Heated Oxygen Sensor High Signal Bank 1 Sensor 1	I	—

B52D Heated Oxygen Sensor - Bank 1 Sensor 2



Connector Part Information

Harness Type: Engine

OEM Connector: 13815348

Service Connector: 13587298

Description: 4-Way F 1.2 Multilock Series, Sealed (L-GY)

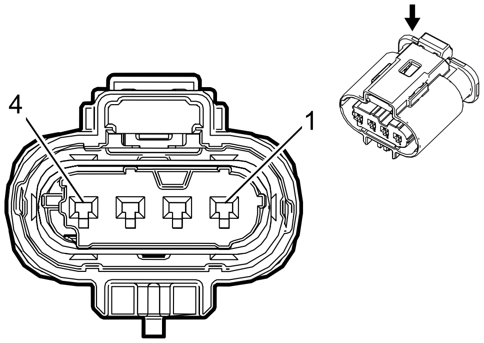
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-16 (LT GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B52D Heated Oxygen Sensor - Bank 1 Sensor 2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.8	GY/WH	3122	Heated Oxygen Sensor Heater Low Control Bank 1 Sensor 2	I	—
2	0.8	PK	1539	Run/Crank Ignition 1 Voltage	I	—
3	0.8	TN/WH	1669	Heated Oxygen Sensor Low Signal Bank 1 Sensor 2	I	—
4	0.8	PU/WH	1668	Heated Oxygen Sensor High Signal Bank 1 Sensor 2	I	—

B52E Heated Oxygen Sensor - Bank 2 Sensor 1



Connector Part Information

Harness Type: Engine

OEM Connector: 13869004

Service Connector: 19301716

Description: 4-Way F 1.2 Multilock Series, Sealed (D-GY)

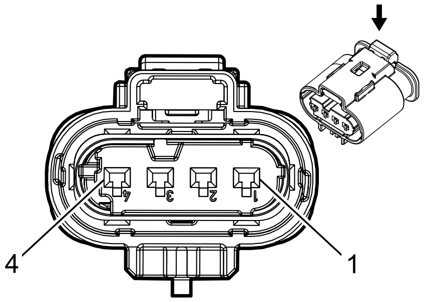
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-16 (LT GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B52E Heated Oxygen Sensor - Bank 2 Sensor 1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.8	L-GN	3212	Heated Oxygen Sensor Heater Low Control Bank 2 Sensor 1	I	—
2	0.8	PK	539	Run/Crank Ignition 1 Voltage	I	—
3	0.8	TN	1667	Heated Oxygen Sensor Low Signal Bank 2 Sensor 1	I	—
4	0.8	PU	1666	Heated Oxygen Sensor High Signal Bank 2 Sensor 1	I	—

B52F Heated Oxygen Sensor - Bank 2 Sensor 2



Connector Part Information

Harness Type: Engine

OEM Connector: 13815348

Service Connector: 13587298

Description: 4-Way F 1.2 Multilock Series, Sealed (L-GY)

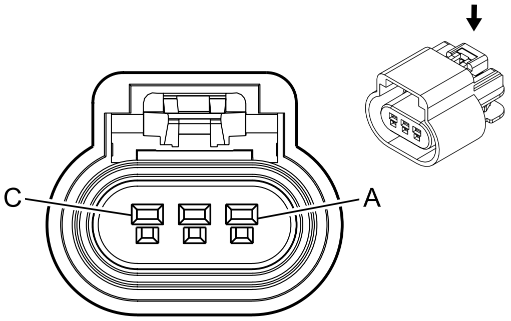
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-16 (LT GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B52F Heated Oxygen Sensor - Bank 2 Sensor 2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.8	OG/WH	3223	Heated Oxygen Sensor Heater Low Control Bank 2 Sensor 2	I	—
2	0.8	PK	1539	Run/Crank Ignition 1 Voltage	I	—
3	0.8	TN	1671	Heated Oxygen Sensor Low Signal Bank 2 Sensor 2	I	—
4	0.8	PU	1670	Heated Oxygen Sensor High Signal Bank 2 Sensor 2	I	—

B55 Hood Ajar Switch



Connector Part Information

Harness Type: Forward Lamp

OEM Connector: 13519047

Service Connector: 13580871

Description: 3-Way F 150 GT Series, Sealed (BK)

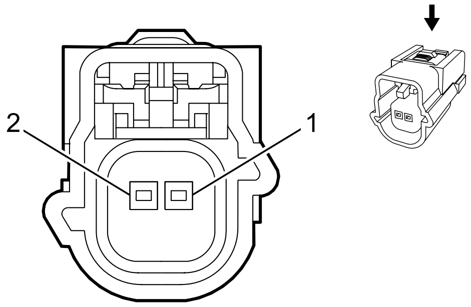
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B55 Hood Ajar Switch

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.5	PK/BK	109	Hood Ajar Switch Signal	I	—
B	0.5	PU	5531	Hood Closed Switch Signal	I	—
C	0.5	BK	250	Ground	I	—

B59 Front Impact Sensor



Connector Part Information

Harness Type: Inflatable Restraint

OEM Connector: 13593078

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F 0.64 Series, Sealed (L-GY)

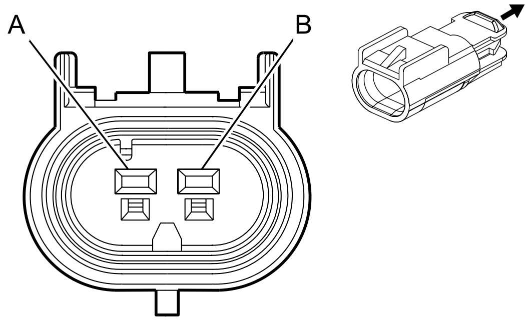
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-64B (LT BU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B59 Front Impact Sensor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	BN/WH	6618	Middle Front Discriminating Sensor Signal	I	—
2	0.5	D-BU/WH	6619	Middle Front Discriminating Sensor Low Reference	I	—

B63LF Side Impact Sensor - Left Front



Connector Part Information

Harness Type: Driver Door

OEM Connector: 13510099

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way M 150 GT Series, Sealed (BK)

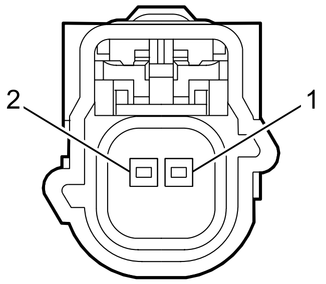
Terminal Part Information

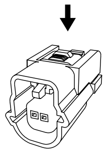
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-3 (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B63LF Side Impact Sensor - Left Front

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.5	PU/WH	6628	Left Front Side Impact Sensing Module Low Reference	I	—
B	0.5	WH	2132	Left Front Side Impact Sensing Module Signal	I	—

B63LR Side Impact Sensor - Left Rear





Connector Part Information

Harness Type: Air Bag Jumper

OEM Connector: 13610095

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F 0.64 Series, Sealed (D-GY)

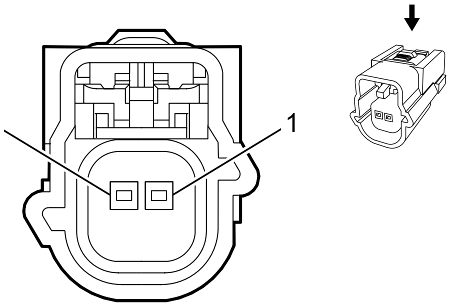
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-64B (LT BU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B63LR Side Impact Sensor - Left Rear

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	D-GN/WH	6620	Left Middle Side Impact Sensing Module Signal	I	—
2	0.5	GY/BK	6621	Left Middle Side Impact Sensing Module Low Reference	I	—

B63RR Side Impact Sensor - Right Rear (E24)



Connector Part Information

Harness Type: Air Bag Jumper

OEM Connector: 13593078

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F 0.64 Series, Sealed (L-GY)

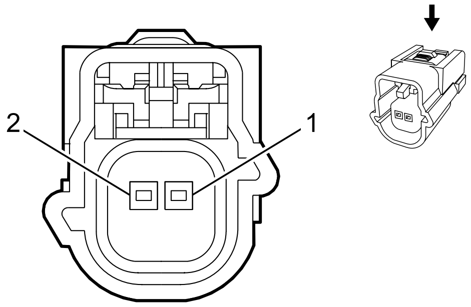
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-64B (LT BU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B63RR Side Impact Sensor - Right Rear (E24)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	L-BU/BK	6624	Right Middle Side Impact Sensing Module Signal	I	—
2	0.5	L-GN/WH	6625	Right Middle Side Impact Sensing Module Low Reference	I	—

B63RR Side Impact Sensor - Right Rear (YA2)



Connector Part Information

Harness Type: Air Bag Jumper

OEM Connector: 13610095

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F 0.64 Series, Sealed (D-GY)

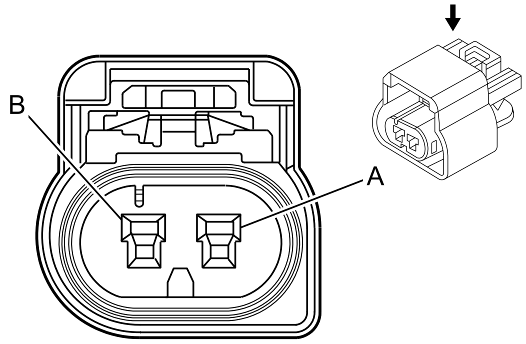
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-64B (LT BU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B63RR Side Impact Sensor - Right Rear (YA2)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	L-BU/BK	6624	Right Middle Side Impact Sensing Module Signal	I	—
2	0.5	L-GN/WH	6625	Right Middle Side Impact Sensing Module Low Reference	I	—

B68A Knock Sensor 1



Connector Part Information

Harness Type: Engine

OEM Connector: 15374222

Service Connector: 13580877

Description: 2-Way F 150 GT Series, Sealed (NA)

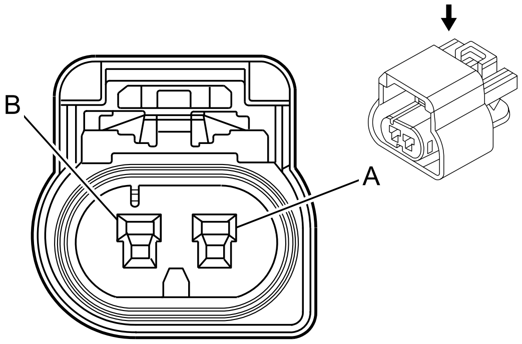
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B68A Knock Sensor 1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	D-BU	496	Knock Sensor Signal 1	I	—
B	0.8	GY	1716	Knock Sensor Low Reference 1	I	—

B68B Knock Sensor 2



Connector Part Information

Harness Type: Engine

OEM Connector: 15374222

Service Connector: 13580877

Description: 2-Way F 150 GT Series, Sealed (NA)

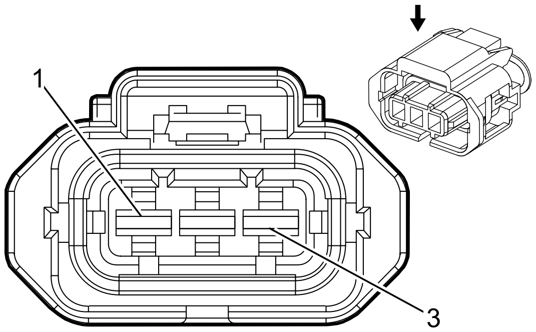
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B68B Knock Sensor 2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	L-BU	1876	Knock Sensor Signal 2	I	—
B	0.8	GY	2303	Knock Sensor Low Reference 2	I	—

B74 Manifold Absolute Pressure Sensor



Connector Part Information

Harness Type: Engine

OEM Connector: 13639747

Service Connector: 19181248

Description: 3-Way F 2.8 Junior Power Timer Series, Sealed (BK)

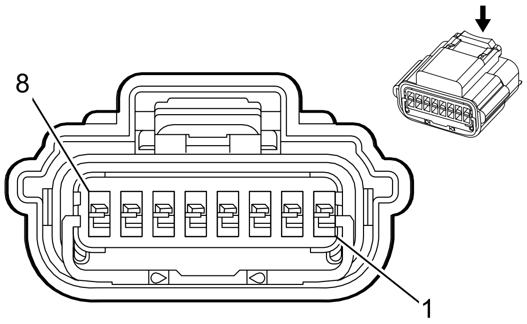
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B74 Manifold Absolute Pressure Sensor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.8	GY	2704	Manifold Absolute Pressure Sensor 5V Reference	I	—
2	0.8	OG/BK	469	Manifold Absolute Pressure Sensor Low Reference	I	—
3	0.8	L-GN	432	Manifold Absolute Pressure Sensor Signal	I	—

B75C Multifunction Intake Air Sensor



Connector Part Information

Harness Type: Engine

OEM Connector: 13774439

Service Connector: 13583440

Description: 8-Way F 0.64 Series, Sealed (BK)

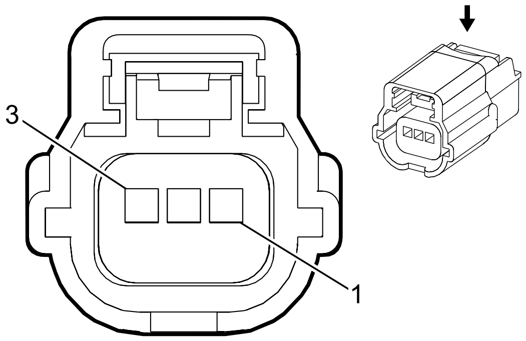
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-64B (LT BU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B75C Multifunction Intake Air Sensor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.75	BN/VT	472	Intake Air Temperature Sensor Signal	I	—
2	0.75	WH/RD	3201	Throttle Inlet Absolute Pressure Sensor 5V Reference	I	—
3	0.75	BK/VT	2760	Intake Air Temperature Sensor Low Reference	I	—
4	0.75	YE/WH	3200	Throttle Inlet Absolute Pressure Sensor Signal	I	—
5	0.75	VT/WH	1939	Run/Crank Ignition 1 Voltage	I	—
6	0.75	L-GN/WH	492	Mass Air Flow Sensor Signal	I	—
7	0.75	BK/WH	1551	Signal Ground	I	—
8	0.75	GY/D-BU	7564	Humidity Sensor Signal	I	—

B78E Rear Object Sensor - Left Middle



Connector Part Information

Harness Type: Rear Fascia

OEM Connector: 13525738

Service Connector: Service by Harness - See Part Catalog

Description: 3-Way F 0.64 Series, Sealed (BK)

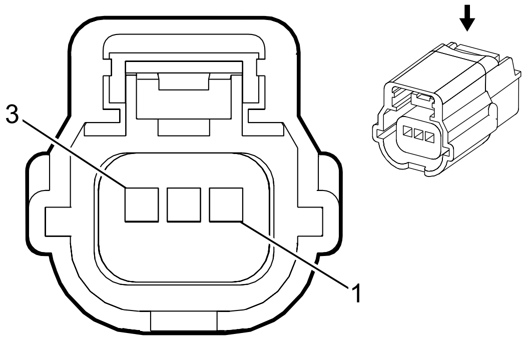
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-16 (LT GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B78E Rear Object Sensor - Left Middle

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	D-BU	2374	Object Sensor Control	I	—
2	0.5	GY	2379	Object Sensor Low Reference	I	—
3	0.5	OG	2376	Left Rear Middle Object Sensor Signal	I	—

B78F Rear Object Sensor - Right Middle



Connector Part Information

Harness Type: Rear Fascia

OEM Connector: 13525738

Service Connector: Service by Harness - See Part Catalog

Description: 3-Way F 0.64 Series, Sealed (BK)

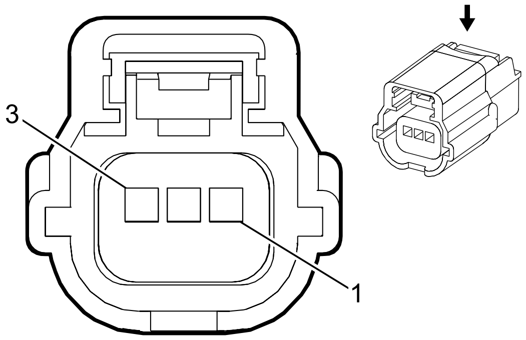
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-16 (LT GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B78F Rear Object Sensor - Right Middle

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	D-BU	2374	Object Sensor Control	I	—
2	0.5	GY	2379	Object Sensor Low Reference	I	—
3	0.5	D-GN	2377	Right Rear Middle Object Sensor Signal	I	—

B78G Rear Object Sensor - Left Outer



Connector Part Information

Harness Type: Rear Fascia

OEM Connector: 13525738

Service Connector: Service by Harness - See Part Catalog

Description: 3-Way F 0.64 Series, Sealed (BK)

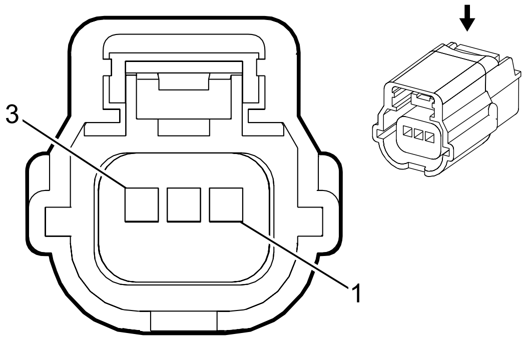
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-16 (LT GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B78G Rear Object Sensor - Left Outer

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	D-BU	2374	Object Sensor Control	I	—
2	0.5	GY	2379	Object Sensor Low Reference	I	—
3	0.5	YE	2375	Left Rear Corner Object Sensor Signal	I	—

B78H Rear Object Sensor - Right Outer



Connector Part Information

Harness Type: Rear Fascia

OEM Connector: 13525738

Service Connector: Service by Harness - See Part Catalog

Description: 3-Way F 0.64 Series, Sealed (BK)

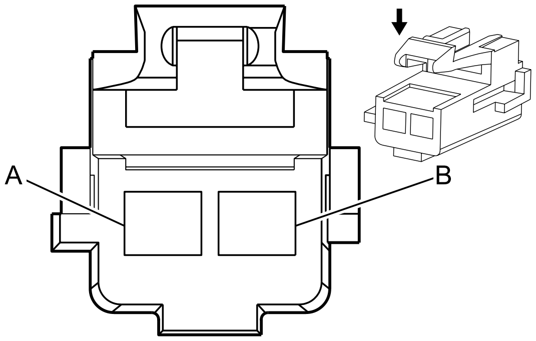
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-16 (LT GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B78H Rear Object Sensor - Right Outer

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	D-BU	2374	Object Sensor Control	I	—
2	0.5	GY	2379	Object Sensor Low Reference	I	—
3	0.5	PU	2378	Right Rear Corner Object Sensor Signal	I	—

B80 Park Brake Switch



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 12129082

Service Connector: 15305896

Description: 2-Way F 280 Metri-Pack Flexlock Series (GY)

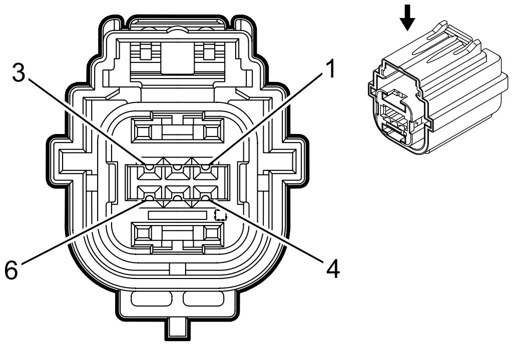
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B80 Park Brake Switch

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.35	L-BU	1134	Park Brake Switch Signal	I	—
B	—	—	—	Not Occupied	—	—

B87 Rearview Camera (UVC+UI8+03)



Connector Part Information

Harness Type: Rearview Camera

OEM Connector: 13629704

Service Connector: Service by Harness - See Part Catalog

Description: 6-Way F 0.64 Series, Sealed (GY)

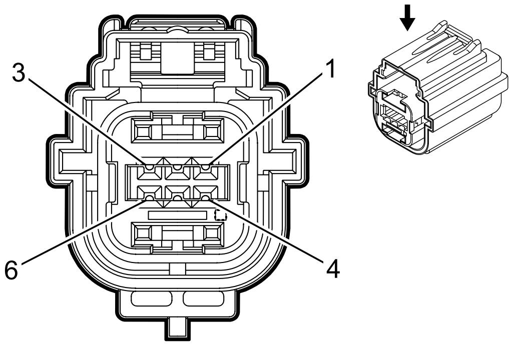
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-64B (LT BU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B87 Rearview Camera (UVC+UI8+03)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	WH	7641	Camera Rear Vision Signal +	I	—
2	0.5	BARE	6799	Camera Shield Ground	I	—
3	0.5	L-GN	24	Backup Lamp Control	I	—
4	0.5	L-BU	7642	Camera Rear Vision Signal (-)	I	—
5	0.5	BK/WH	351	Signal Ground	I	—
6	0.5	PK	239	Run/Crank Ignition 1 Voltage	I	—

B87 Rearview Camera (UVC+UI8+05/06)



Connector Part Information

Harness Type: Right Rear Cargo Door

OEM Connector: 13629704

Service Connector: Service by Harness - See Part Catalog

Description: 6-Way F 0.64 Series, Sealed (GY)

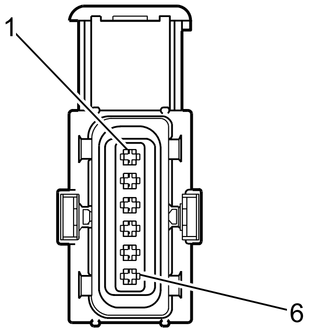
Terminal Part Information

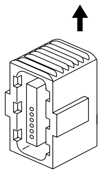
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-64B (LT BU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B87 Rearview Camera (UVC+UI8+05/06)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	YE	7641	Camera Rear Vision Signal +	I	—
2	0.5	BARE	6799	Camera Shield Ground	I	—
3	0.5	L-GN	24	Backup Lamp Control	I	—
4	0.5	L-BU	7642	Camera Rear Vision Signal (-)	I	—
5	0.5	BK	351	Signal Ground	I	—
6	0.5	PK	239	Run/Crank Ignition 1 Voltage	I	—

B107 Accelerator Pedal Position Sensor





Connector Part Information

Harness Type: Accelerator Pedal Position Sensor

OEM Connector: 15383136

Service Connector: Service by Harness - See Part Catalog

Description: 6-Way F 1.2 Micro-Timer Series, Sealed (BK)

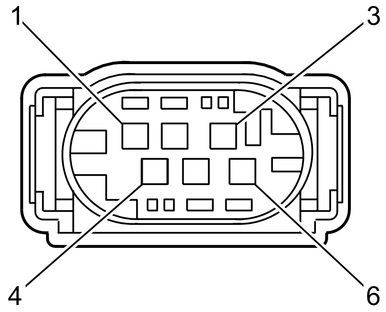
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-2A (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B107 Accelerator Pedal Position Sensor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.35	TN	1274	Accelerator Pedal Position 5V Reference 2	I	—
2	0.35	WH/BK	1164	Accelerator Pedal Position 5V Reference 1	I	—
3	0.35	D-BU	1161	Accelerator Pedal Position Signal 1	I	—
4	0.35	BN	1271	Accelerator Pedal Position Low Reference 1	I	—
5	0.35	PU	1272	Accelerator Pedal Position Low Reference 2	I	—
6	0.35	L-BU	1162	Accelerator Pedal Position Signal 2	I	—

B119 Multi-axis Acceleration Sensor



Connector Part Information

Harness Type: Body

OEM Connector: 15355474

Service Connector: 15306420

Description: 6-Way F 0.64 Micro-Quadlock Series, Sealed (BK)

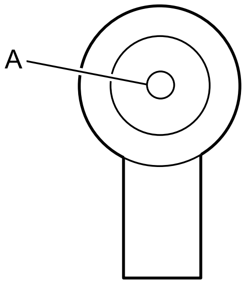
Terminal Part Information

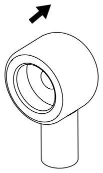
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-64B (LT BU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B119 Multi-axis Acceleration Sensor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	GY/BK	1337	Yaw Rate Sensor 5V Reference	I	—
2	0.5	BN/WH	6437	CAN Bus High Terminated Serial Data	I	—
3	0.5	WH/BK	6436	CAN Bus Low Terminated Serial Data	I	—
4 - 5	—	—	—	Not Occupied	—	—
6	0.5	BK/PU	7499	Yaw Rate Sensor Low Reference	I	—

B133 Brake Booster Fluid Flow Alarm Switch X1





Connector Part Information

Harness Type: Brake Fluid Level Switch

OEM Connector: 6288440

Service Connector: Service by Harness - See Part Catalog

Description: 1-Way F Grip Series (BK)

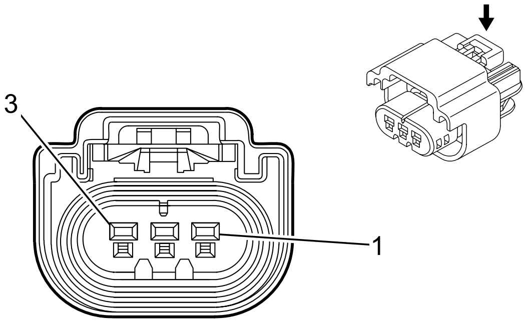
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B133 Brake Booster Fluid Flow Alarm Switch X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.5	L-BU/BK	1928	Brake Booster Fluid Flow Switch Signal	I	—

B150 Fuel Tank Pressure Sensor



Connector Part Information

Harness Type: Chassis

OEM Connector: 13522407

Service Connector: 19179274

Description: 3-Way F 150 GT Series, Sealed (BK)

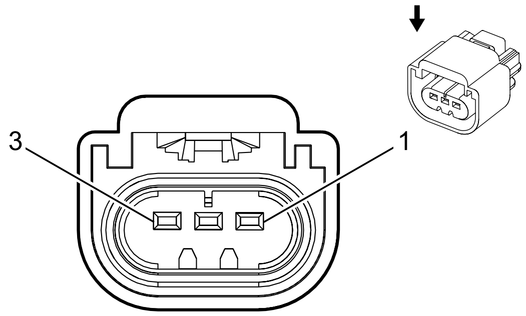
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B150 Fuel Tank Pressure Sensor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	D-GN	890	Fuel Tank Pressure Sensor Signal	I	—
2	0.5	TN	2759	Fuel Tank Pressure Sensor Low Reference	I	—
3	0.5	GY	2709	Fuel Tank Pressure Sensor 5V Reference	I	—

B198 Fuel Composition Sensor



Connector Part Information

- Harness Type: Chassis
- OEM Connector: 13511132
- Service Connector: 19301582
- Description: 3-Way F 150 GT Series, Sealed (BN)

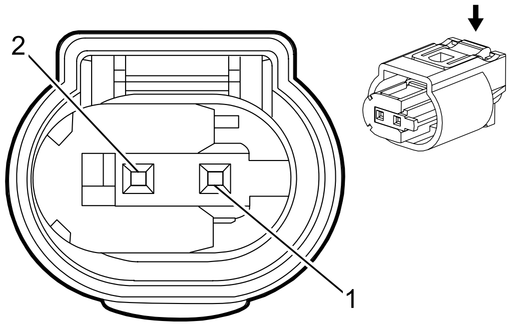
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B198 Fuel Composition Sensor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.8	PK/BK	5294	Powertrain Main Relay Fused Supply 5	I	—
2	0.8	BK/WH	1551	Signal Ground	I	—
3	0.8	WH	1579	Fuel Temperature/Composition Signal	I	—

B203 Engine Coolant Radiator Temperature Sensor



Connector Part Information

Harness Type: Forward Lamp

OEM Connector: 15365708

Service Connector: 13576533

Description: 2-Way F 0.64 Micro-Quadlock Series, Sealed (BK)

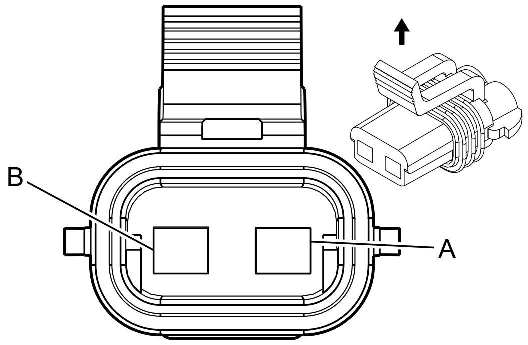
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-64B (LT BU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

B203 Engine Coolant Radiator Temperature Sensor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.8	L-GN	2032	Coolant Temperature Sensor Signal	I	—
2	0.8	L-BU/BK	6813	Coolant Temperature Sensor 2 Low Reference	I	—

E2LF Side Marker Lamp - Left Front



Connector Part Information

Harness Type: Forward Lamp

OEM Connector: 15300027

Service Connector: 12101855

Description: 2-Way F 280 Metri-Pack Series, Sealed (BK)

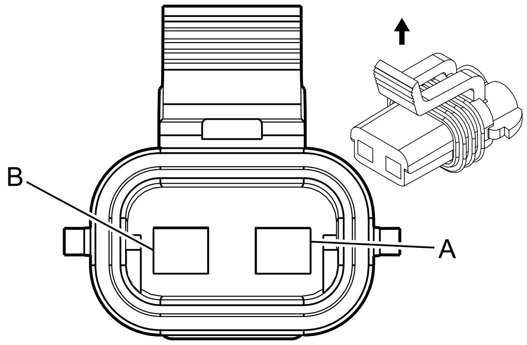
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

E2LF Side Marker Lamp - Left Front

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.5	BN	2309	Front Park Lamp Control	I	—
B	0.5	BK	250	Ground	I	—

E2RF Side Marker Lamp - Right Front



Connector Part Information

Harness Type: Forward Lamp

OEM Connector: 15300027

Service Connector: 12101855

Description: 2-Way F 280 Metri-Pack Series, Sealed (BK)

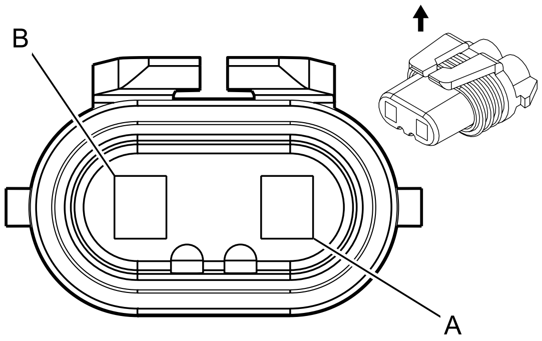
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

E2RF Side Marker Lamp - Right Front

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.5	BN	2309	Front Park Lamp Control	I	—
B	0.5	BK	650	Ground	I	—

E4E Headlamp - Left High Beam



Connector Part Information

Harness Type: Forward Lamp

OEM Connector: 12059183

Service Connector: 12101898

Description: 2-Way F 280 Metri-Pack Series, Sealed (BK)

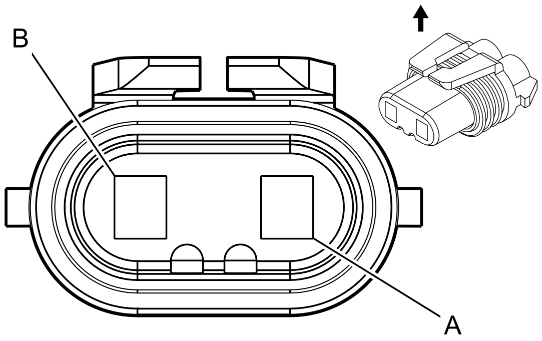
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

E4E Headlamp - Left High Beam

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.5	D-GN/WH	711	Left Headlamp High Beam Control	I	—
B	0.8	BK	250	Ground	I	—

E4F Headlamp - Right High Beam



Connector Part Information

Harness Type: Forward Lamp

OEM Connector: 12059183

Service Connector: 12101898

Description: 2-Way F 280 Metri-Pack Series, Sealed (BK)

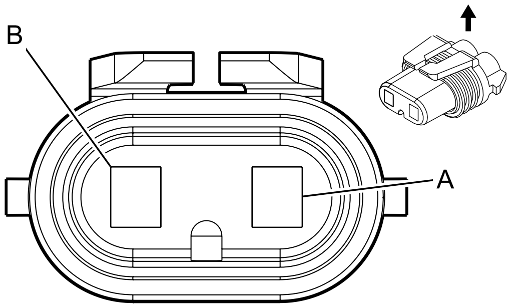
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

E4F Headlamp - Right High Beam

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	L-GN/BK	311	Right Headlamp High Beam Control	I	—
B	0.8	BK	650	Ground	I	—

E4G Headlamp - Left Low Beam



Connector Part Information

Harness Type: Forward Lamp

OEM Connector: 12059181

Service Connector: 19301866

Description: 2-Way F 280 Metri-Pack Series, Sealed (GY)

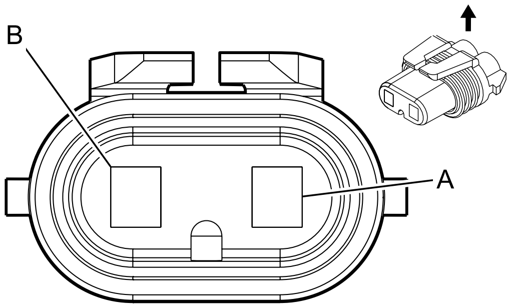
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

E4G Headlamp - Left Low Beam

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	YE	712	Left Headlamp Low Beam Control	I	V22
	0.5	YE	712	Left Headlamp Low Beam Control	I	-V22
B	0.8	BK	250	Ground	I	—

E4H Headlamp - Right Low Beam



Connector Part Information

Harness Type: Forward Lamp

OEM Connector: 12059181

Service Connector: 19301866

Description: 2-Way F 280 Metri-Pack Series, Sealed (GY)

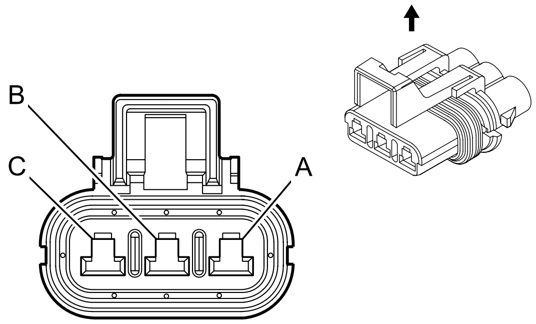
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

E4H Headlamp - Right Low Beam

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	TN/WH	312	Right Headlamp Low Beam Control	I	V22
	0.5	TN/WH	312	Right Headlamp Low Beam Control	I	-V22
B	0.8	BK	650	Ground	I	—

E4N Park/Turn Signal Lamp - Left



Connector Part Information

Harness Type: Forward Lamp

OEM Connector: 12040977

Service Connector: 12085492

Description: 3-Way F 280 Metri-Pack Series, Sealed (BK)

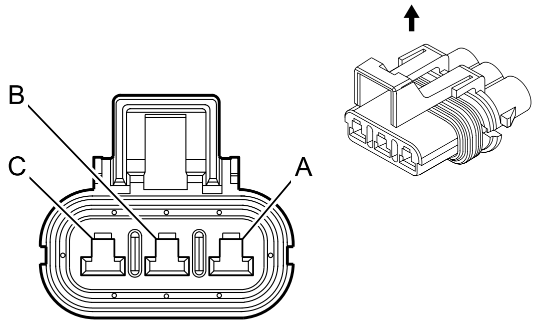
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

E4N Park/Turn Signal Lamp - Left

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	L-BU/WH	1314	Left Front Turn Signal Lamp Control	I	—
B	0.5	BN	2309	Front Park Lamp Control	I	—
C	0.5	BK	250	Ground	I	—

E4P Park/Turn Signal Lamp - Right



Connector Part Information

Harness Type: Forward Lamp

OEM Connector: 12040977

Service Connector: 12085492

Description: 3-Way F 280 Metri-Pack Series, Sealed (BK)

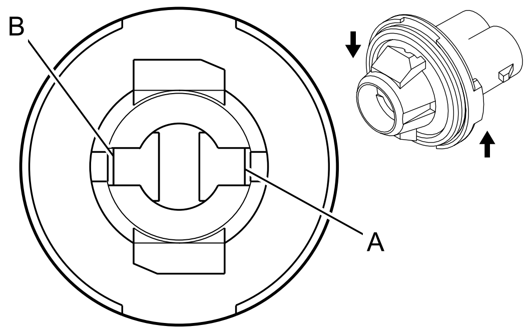
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

E4P Park/Turn Signal Lamp - Right

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	D-BU/WH	1315	Right Front Turn Signal Lamp Control	I	—
B	0.5	BN	2309	Front Park Lamp Control	I	—
C	0.5	BK	650	Ground	I	—

E7 License Plate Lamp



Connector Part Information

Harness Type: Right Rear Cargo Door

OEM Connector: 15324946

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F Lamp Socket Wedge Base, Type W-2 (D-GY)

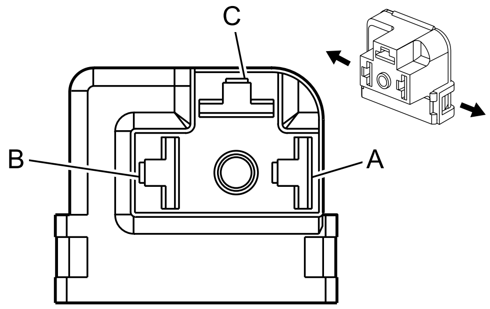
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	No Tool Required	No Tool Required	Not Required	Not Required	Not Required	Not Required

E7 License Plate Lamp

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.5	BN	2509	Left Rear Park Lamp Control	I	—
B	0.5	BK	1050	Ground	I	—

E13L Headlamp - Left



Connector Part Information

Harness Type: Forward Lamp

OEM Connector: 12034372

Service Connector: 12117369

Description: 3-Way F 800 Metri-Pack Series (BK)

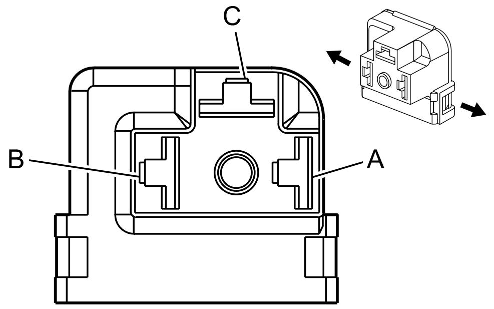
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-44 (YE)	No Tool Required	Not Required	Not Required	Not Required	Not Required

E13L Headlamp - Left

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.5	BK	250	Ground	I	—
B	0.5	D-GN/WH	711	Left Headlamp High Beam Control	I	—
C	0.5	YE	712	Left Headlamp Low Beam Control	I	—

E13R Headlamp - Right



Connector Part Information

Harness Type: Forward Lamp

OEM Connector: 12034372

Service Connector: 12117369

Description: 3-Way F 800 Metri-Pack Series (BK)

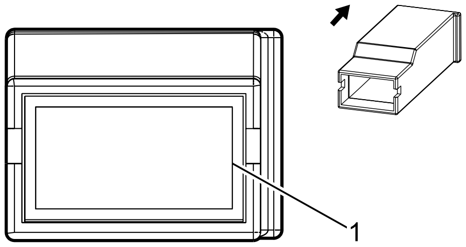
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-44 (YE)	No Tool Required	Not Required	Not Required	Not Required	Not Required

E13R Headlamp - Right

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	BK	650	Ground	I	—
B	0.8	L-GN/BK	311	Right Headlamp High Beam Control	I	—
C	0.5	TN/WH	312	Right Headlamp Low Beam Control	I	—

E18L Rear Defogger Grid - Left X1



Connector Part Information

Harness Type: Rear Window Defogger Jumper

OEM Connector: 12103107

Service Connector: Service by Harness - See Part Catalog

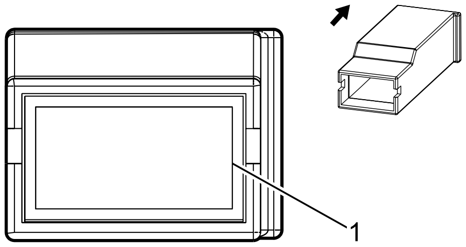
Description: 1-Way F 6.3 Positive Lock Series (BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-42 (RD)	No Tool Required	Not Required	Not Required	Not Required	Not Required

E18L Rear Defogger Grid - Left X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	5	PU	293	Rear Defog Element Control	I	—



Connector Part Information

Harness Type: Rear Window Defogger Jumper

OEM Connector: 12103107

Service Connector: Service by Harness - See Part Catalog

Description: 1-Way F 6.3 Positive Lock Series (BK)

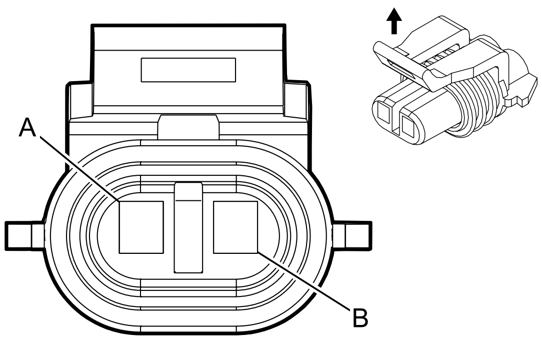
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-42 (RD)	No Tool Required	Not Required	Not Required	Not Required	Not Required

E18L Rear Defogger Grid - Left X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	3	BK	850	Ground	I	—

E22 Underhood Lamp



Connector Part Information

Harness Type: Engine

OEM Connector: 12052641

Service Connector: 13586114

Description: 2-Way F 150 Metri-Pack Series (BK)

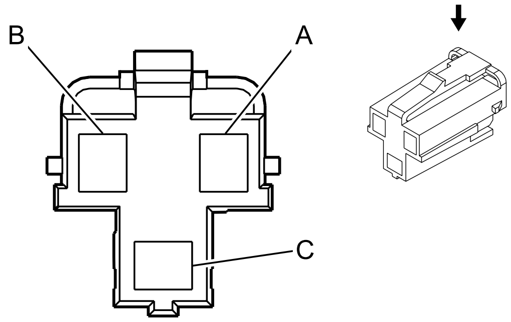
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

E22 Underhood Lamp

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.5	OG	1732	Electronic Control Unit 12V Reference 3	I	—
B	0.8	BK	1250	Ground	I	—

E32 Cigarette Lighter Receptacle (DT4)



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 12176836

Service Connector: 19257374

Description: 3-Way F 280 Metri-Pack Series (GY)

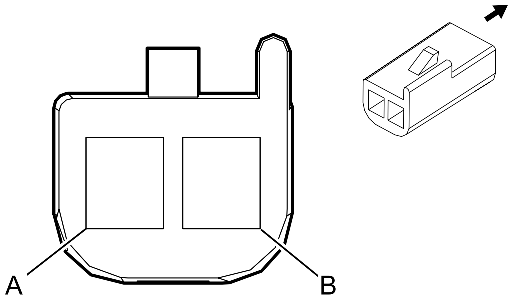
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

E32 Cigarette Lighter Receptacle (DT4)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	1	RD/WH	640	Battery Positive Voltage	I	—
B	—	—	—	Not Occupied	—	—
C	1	BK	550	Ground	I	—

E36AC Dome Lamp - Left Roof Rail



Connector Part Information

- Harness Type: Body
- OEM Connector: 12047662
- Service Connector: 12085535
- Description: 2-Way F 150 Metri-Pack Series (BK)

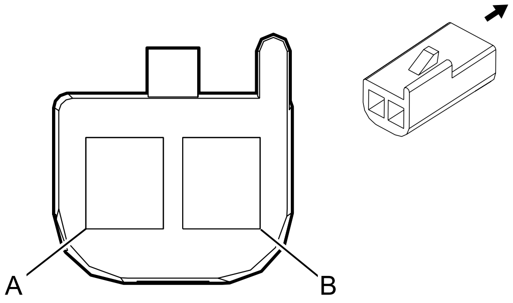
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

E36AC Dome Lamp - Left Roof Rail

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	D-BU/WH	149	Courtesy Lamp Control	I	—
B	0.8	BK	850	Ground	I	—

E36AD Dome Lamp - Right Roof Rail



Connector Part Information

Harness Type: Body

OEM Connector: 12047662

Service Connector: 12085535

Description: 2-Way F 150 Metri-Pack Series (BK)

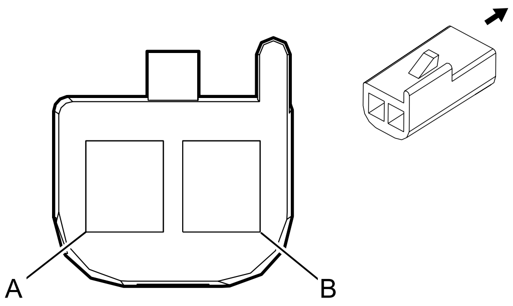
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

E36AD Dome Lamp - Right Roof Rail

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	D-BU/WH	149	Courtesy Lamp Control	I	—
B	0.8	BK	850	Ground	I	—

E36AH Dome Lamp



Connector Part Information

Harness Type: Body

OEM Connector: 12047662

Service Connector: 12085535

Description: 2-Way F 150 Metri-Pack Series (BK)

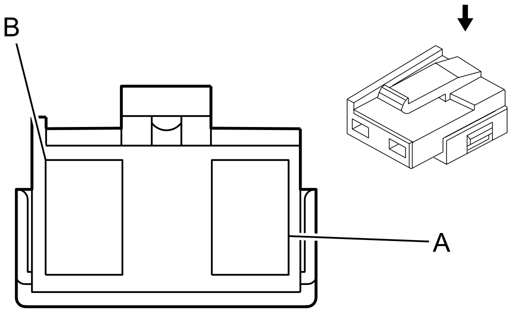
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

E36AH Dome Lamp

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	D-BU/WH	149	Courtesy Lamp Control	I	—
B	0.8	BK	850	Ground	I	—

E37A Dome/Reading Lamps ((LWB/SWB)+5B3)



Connector Part Information

Harness Type: Body

OEM Connector: 12034343

Service Connector: 12101821

Description: 2-Way F 280 Metri-Pack Series (BK)

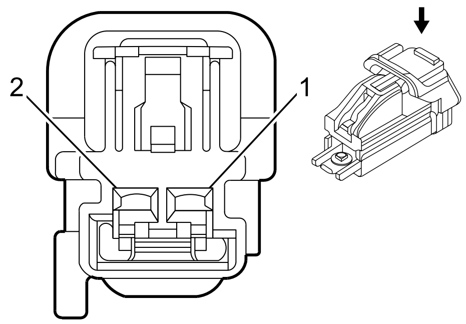
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

E37A Dome/Reading Lamps ((LWB/SWB)+5B3)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	3	BN	541	Run Ignition 3 Voltage	I	—
B	3	BK	1050	Ground	I	—

E37A Dome/Reading Lamps (LWB)



Connector Part Information

Harness Type: Headliner Rear Extension

OEM Connector: 10846794

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F 1.5 YESC Series (L-GY)

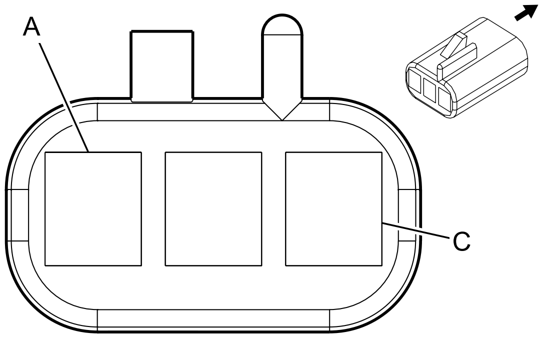
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-2A (GY)	Pending	Not Required	Not Required	Not Required	Not Required

E37A Dome/Reading Lamps (LWB)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	2	BK	1050	Ground	I	—
2	2	BN	541	Run Ignition 3 Voltage	I	—

E37F Dome/Reading Lamps - Front



Connector Part Information

Harness Type: Headliner

OEM Connector: 12047781

Service Connector: 13586139

Description: 3-Way F 150 Metri-Pack Series (BK)

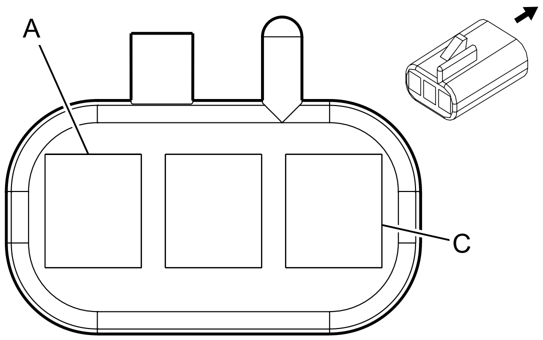
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

E37F Dome/Reading Lamps - Front

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.5	D-BU/WH	149	Courtesy Lamp Control	I	—
B	1	BK	1850	Ground	I	—
C	0.8	OG	1732	Electronic Control Unit 12V Reference 3	I	—

E37M Dome/Reading Lamps - Middle



Connector Part Information

Harness Type: Headliner Rear Extension

OEM Connector: 12047781

Service Connector: Service by Harness - See Part Catalog

Description: 3-Way F 150 Metri-Pack Series (BK)

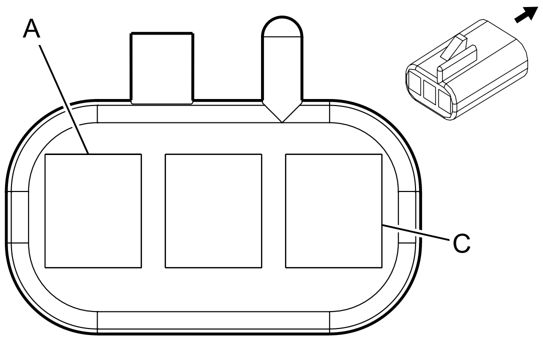
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	Pending	Not Required	Not Required	Not Required	Not Required

E37M Dome/Reading Lamps - Middle

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	D-BU/WH	149	Courtesy Lamp Control	I	—
B	0.5	BK	1050	Ground	I	—
C	0.8	OG	1732	Electronic Control Unit 12V Reference 3	I	—

E37R Dome/Reading Lamps - Rear



Connector Part Information

Harness Type: Headliner Rear Extension

OEM Connector: 12047781

Service Connector: Service by Harness - See Part Catalog

Description: 3-Way F 150 Metri-Pack Series (BK)

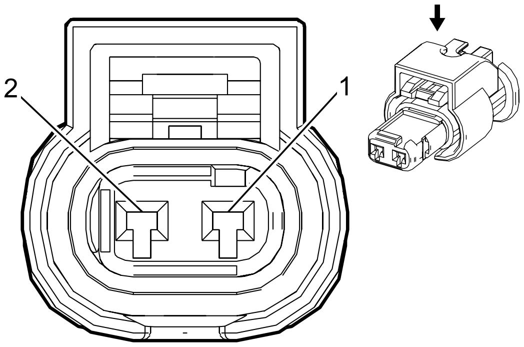
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	Pending	Not Required	Not Required	Not Required	Not Required

E37R Dome/Reading Lamps - Rear

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	D-BU/WH	149	Courtesy Lamp Control	I	—
B	0.5	BK	1050	Ground	I	—
C	0.8	OG	1732	Electronic Control Unit 12V Reference 3	I	—

F101 Passenger Instrument Panel Air Bag



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 13863037

Service Connector: 13587886

Description: 2-Way F 1.2 MCP Series, Sealed (YE)

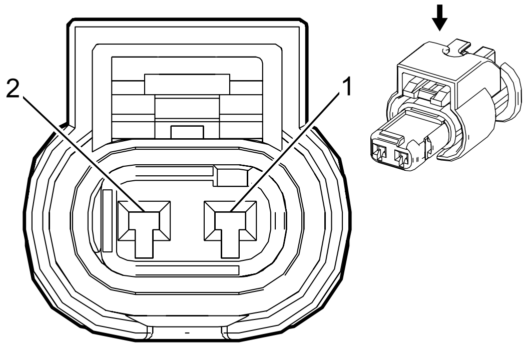
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-16 (LT GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

F101 Passenger Instrument Panel Air Bag

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	YE	3025	Passenger IP Module Stage 1 High Control	I	—
2	0.5	OG	3024	Passenger IP Module Stage 1 Low Control	I	—

F105LF Roof Rail Air Bag - Left Front



Connector Part Information

Harness Type: Body

OEM Connector: 13863037

Service Connector: 13587886

Description: 2-Way F 1.2 MCP Series, Sealed (YE)

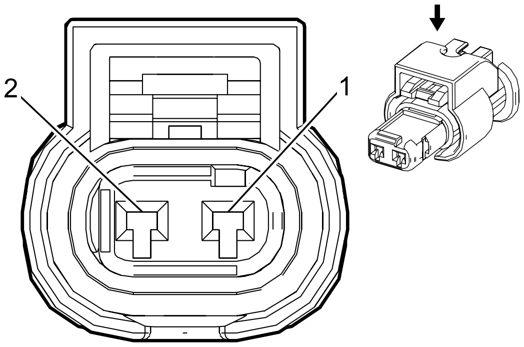
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-16 (LT GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

F105LF Roof Rail Air Bag - Left Front

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	PK	5020	Left Front Head Curtain Module Low Control	I	—
2	0.5	PU/WH	5019	Left Front Head Curtain Module High Control	I	—

F105RF Roof Rail Air Bag - Right Front



Connector Part Information

Harness Type: Body

OEM Connector: 13863037

Service Connector: 13587886

Description: 2-Way F 1.2 MCP Series, Sealed (YE)

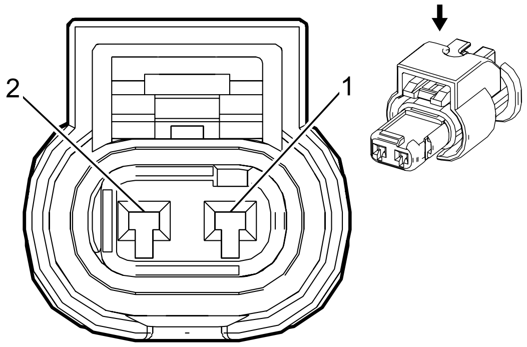
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-16 (LT GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

F105RF Roof Rail Air Bag - Right Front

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	WH/BK	5022	Right Front Head Curtain Module Low Control	I	—
2	0.5	YE/BK	5021	Right Front Head Curtain Module High Control	I	—

F105RR Roof Rail Air Bag - Right Rear



Connector Part Information

Harness Type: Body

OEM Connector: 13863037

Service Connector: 13587886

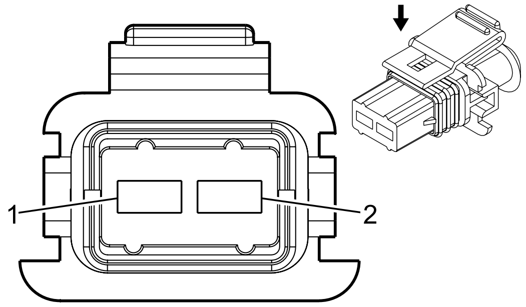
Description: 2-Way F 1.2 MCP Series, Sealed (YE)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-16 (LT GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

F105RR Roof Rail Air Bag - Right Rear

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	TN/BK	7016	Right Rear Head Curtain Module Low Control	I	—
2	0.5	L-BU	7015	Right Rear Head Curtain Module High Control	I	—



Connector Part Information

Harness Type: Engine

OEM Connector: 12186308

Service Connector: 13585849

Description: 2-Way F Junior Power Timer Series, Sealed (BK)

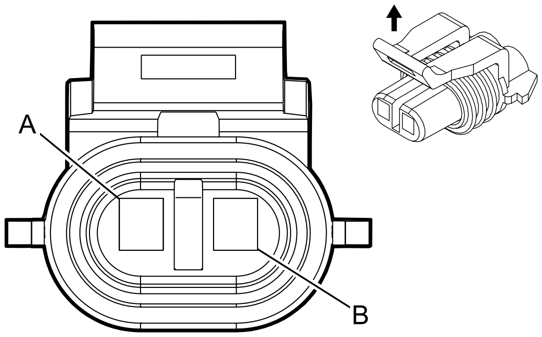
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

G13 Generator X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	OG	225	Generator Turn On Signal	I	—
2	0.5	GY	23	Generator Field Duty Cycle Signal	I	—

G24 Windshield Washer Pump



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 12052641

Service Connector: 13586114

Description: 2-Way F 150 Metri-Pack Series (BK)

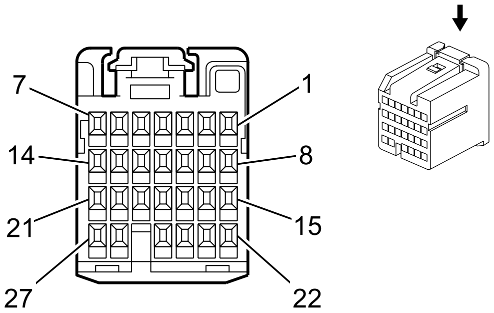
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

G24 Windshield Washer Pump

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.5	OG	228	Windshield Washer Pump Control	I	—
B	0.5	BK	350	Ground	I	—

K9 Body Control Module X1



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 15482789

Service Connector: 88988838

Description: 27-Way F HIT Series (L-GN)

Terminal Part Information

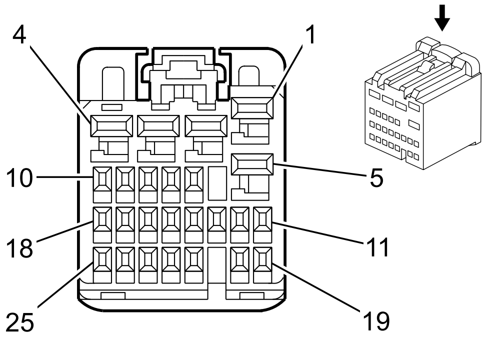
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575870	J-35616-64B (LT BU)	J-38125-12A	SNAC3-A021T-M0.64	Delphi 20	J	J

K9 Body Control Module X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	—	—	—	Not Occupied	—	—
2	0.35	PK	1020	Off/Run/Crank Ignition Voltage	I	—
3	0.35	GY	1884	Cruise Control Set/Coast/Resume/Accelerate Switch Signal	I	—
4	0.35	WH	530	Off/Run/Crank Ignition Voltage	I	—
5	0.35	L-GN	1715	Windshield Wiper Switch High Signal	I	—
6	0.35	L-GN	6818	Steering Wheel Resistor Ladder Signal 1	I	—
7	—	—	—	Not Occupied	—	—
8	0.35	TN/BK	6009	Windshield Wiper Switch Low Reference	I	—
9	0.35	L-BU	1714	Windshield Wiper Switch Low Signal	I	—

10 - 13	—	—	—	Not Occupied	—	—
14	0.35	PK	3	Run/Crank Ignition 1 Voltage	I	—
15	0.35	D-GN	663	Hazard Switch Left Turn Signal	I	—
16	0.35	TN	664	Hazard Switch Right Turn Signal	I	—
17	0.35	PK	1444	12V Reference	I	—
18	0.35	YE	525	Headlamp Dimmer Switch Low Beam Signal	I	—
19	0.35	WH	111	Hazard Switch Signal	I	—
20	0.35	PU	5526	Tap Up/Tap Down Switch Signal	I	—
21	0.35	BN	4	Accessory Ignition Voltage	I	—
22	—	—	—	Not Occupied	—	—
23	0.35	L-BU	1788	Traction Control Switch Signal 1	I	—
24	0.35	PK	94	Windshield Washer Switch Signal	I	—
25	0.35	YE	307	Headlamp Switch Flash To Pass Signal	I	—
26	0.5	TN/WH	816	Brake Transmission Shift Interlock Solenoid Control	I	—
27	—	—	—	Not Occupied	—	—

K9 Body Control Module X2



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 15482790

Service Connector: 88988839

Description: 25-Way F HIT Series (NA)

Terminal Part Information

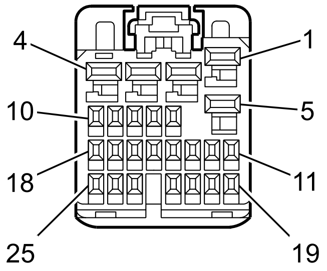
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575870	J-35616-64B (LT BU)	J-38125-12A	SNAC3-A021T-M0.64	Delphi 20	J	J
II	13575871	J-35616-35 (VT)	J-38125-12A	SNAC-A061T-M2.8	Delphi 20	E	A

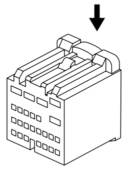
K9 Body Control Module X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.8	OG	1732	Electronic Control Unit 12V Reference 3	II	—
2	0.5	RD/WH	2540	Battery Positive Voltage	II	—
3	0.5	BN/WH	230	Instrument Panel Lamp Dimming Control	II	—
4	—	—	—	Not Occupied	—	—
5	0.5 0.8	GY/BK D-BU/WH	690 149	Courtesy Lamp Relay Control Courtesy Lamp Control	II II	5BV -5BV
6 - 7	—	—	—	Not Occupied	—	—
8	0.35	L-BU	13	Headlamp Switch Park Lamp Signal	I	—
9 - 10	—	—	—	Not Occupied	—	—

11	0.35	WH	278	Ambient Light Sensor Signal	I	—
12	0.35	WH	103	Headlamp Switch On Signal	I	—
13 - 16	—	—	—	Not Occupied	—	—
17	0.35	D-GN	306	Headlamp Switch Headlamps Off Signal Control	I	—
18	0.35	D-BU/WH	149	Courtesy Lamp Control	I	—
19 - 20	—	—	—	Not Occupied	—	—
21	0.5	D-BU	6727	Vehicle Stability Control Off Switch Signal	I	—
22	0.35	D-BU	38	Backup Lamp Relay Control	I	—
23 - 24	—	—	—	Not Occupied	—	—
25	0.35	PU	328	Interior Lamp Defeat Switch Signal	I	—

K9 Body Control Module X3





Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 15482791

Service Connector: 88988840

Description: 25-Way F HIT Series (L-BU)

Terminal Part Information

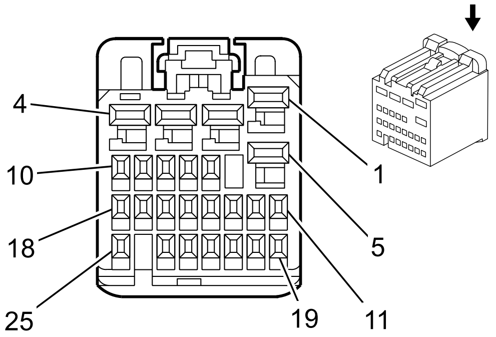
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575870	J-35616-64B (LT BU)	J-38125-12A	SNAC3-A021T-M0.64	Delphi 20	J	J
II	13575871	J-35616-35 (VT)	J-38125-12A	SNAC-A061T-M2.8	Delphi 20	E	A

K9 Body Control Module X3

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.8	BK/WH	351	Signal Ground	II	—
2	0.8	RD/WH	2140	Battery Positive Voltage	II	—
3	0.5	RD/WH	3840	Battery Positive Voltage	II	—
4	—	—	—	Not Occupied	—	—
5	0.8	BK/WH	351	Signal Ground	II	—
6 - 7	—	—	—	Not Occupied	—	—
8	0.5	TN/BK	2500	High Speed GMLAN Serial Data (+) 1	I	—
9	0.5	TN	2501	High Speed GMLAN Serial Data (-) 1	I	—

10	0.35	D-GN	5060	Low Speed GMLAN Serial Data	I	—
11	0.35	D-GN	44	Instrument Panel Lamp Dimmer Switch Signal	I	—
12	0.35	OG/WH	812	12V Reference	I	—
13	0.5	TN	5380	Brake Position Sensor Signal	I	—
14	0.5	BN/WH	5382	Brake Position Sensor Low Reference	I	—
15	0.5	GY	5381	Brake Position Sensor 5V Reference	I	—
16	0.5	TN/BK	2500	High Speed GMLAN Serial Data (+) 1	I	-JL4+LGH
	0.5	D-BU	2500	High Speed GMLAN Serial Data (+) 1	I	LWN
17	0.5	WH	2501	High Speed GMLAN Serial Data (-) 1	I	-JL4+LGH
	0.5	TN	2501	High Speed GMLAN Serial Data (-) 1	I	LWN
18	0.5	YE	6817	LED Backlight Dimming Control	I	—
19	0.5	L-BU	5986	Serial Data Communication Enable	I	—
20 - 21	—	—	—	Not Occupied	—	—
22	0.35	D-GN/WH	7158	Cruise Control Indicator Dimming Signal	I	—
23 - 25	—	—	—	Not Occupied	—	—

K9 Body Control Module X4



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 15482792

Service Connector: 88988841

Description: 25-Way F HIT Series (BK)

Terminal Part Information

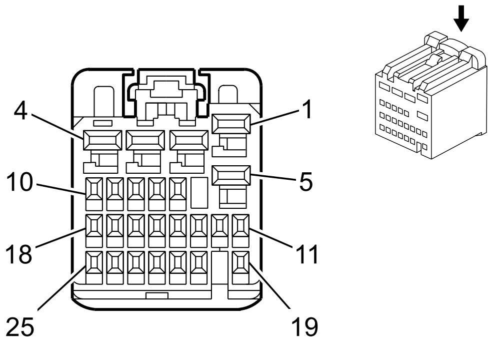
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575870	J-35616-64B (LT BU)	J-38125-12A	SNAC3-A021T-M0.64	Delphi 20	J	J
II	13575871	J-35616-35 (VT)	J-38125-12A	SNAC-A061T-M2.8	Delphi 20	E	A

K9 Body Control Module X4

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.8	RD/WH	2740	Battery Positive Voltage	II	—
2	0.8	RD/WH	3040	Battery Positive Voltage	II	—
3	0.8	RD/WH	2940	Battery Positive Voltage	II	—
4	0.8	RD/WH	2240	Battery Positive Voltage	II	—
5	0.8	D-BU/WH	1315	Right Front Turn Signal Lamp Control	II	—
6	0.35	D-GN	6134	Local Interconnect Network Serial Data Bus 3	I	—
7	0.35	YE	196	Windshield Wiper Motor Park Switch Signal	I	—
8	—	—	—	Not Occupied	—	—

8	—	—	—	Not Occupied	—	—
9	0.5	BK/WH	451	Signal Ground	I	—
10	0.5	RD/WH	2840	Battery Positive Voltage	I	—
11	0.5	L-GN	1391	Left Front Door Lock Relay Control	I	—
12	0.35	YE	5187	Right Trailer Turn Signal Lamp Control	I	—
13	0.35	OG	5186	Left Trailer Turn Signal Lamp Control	I	—
14	—	—	—	Not Occupied	—	—
15	0.35	OG	2268	Windshield Washer Relay Control	I	—
16	0.35	TN/WH	1969	Headlamp High Beam Relay Control	I	—
17	0.5	PK/BK	109	Hood Ajar Switch Signal	I	—
18	—	—	—	Not Occupied	—	—
19	0.5	D-BU	5985	Accessory Wakeup Serial Data	I	—
20	0.5	L-BU	1344	Rear Compartment Lid Release Relay Control	I	—
21	0.35	YE	5199	Run/Crank Relay Coil Control	I	—
22	—	—	—	Not Occupied	—	—
23	0.35	PU	544	DRL Relay Control	I	—
24	0.5	L-BU	244	Passenger Door Lock Switch Lock Control	I	—
25	—	—	—	Not Occupied	—	—

K9 Body Control Module X5



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 15480179

Service Connector: 88988837

Description: 25-Way F HIT Series (BN)

Terminal Part Information

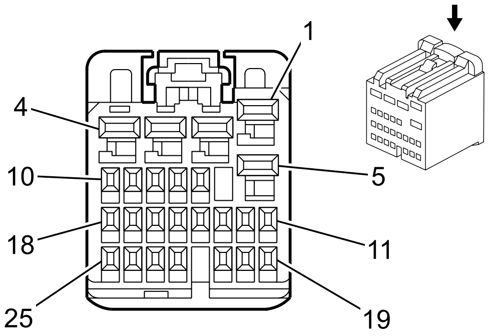
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575870	J-35616-64B (LT BU)	J-38125-12A	SNAC3-A021T-M0.64	Delphi 20	J	J
II	13575871	J-35616-35 (VT)	J-38125-12A	SNAC-A061T-M2.8	Delphi 20	C	A
III	13575871	J-35616-35 (VT)	J-38125-12A	SNAC-A061T-M2.8	Delphi 20	E	A

K9 Body Control Module X5

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	1	YE	618	Left Rear Turn Signal Lamp Control	II	—
2	1	D-GN	619	Right Rear Turn Signal Lamp Control	II	—
3	—	—	—	Not Occupied	—	—
4	0.8	L-BU/WH	1314	Left Front Turn Signal Lamp Control	III	—
5	0.5	WH	5065	Stop Lamp Relay Coil Control	III	—
6	0.35	WH/D-BU	6311	Cruise/ETC/TCC Brake Signal	I	—
7	—	—	—	Not Occupied	—	—
8	0.5	PK	5076	Current Sensor Control	I	—

9	0.5	WH	5075	Current Sensor Signal	I	—
10	0.5	BN	5077	Current Sensor Low Reference	I	—
11	0.35	YE	43	Accessory Ignition Voltage	I	—
12	—	—	—	Not Occupied	—	—
13	0.35	OG	300	Run Ignition 3 Voltage	I	—
14	0.5	L-GN	24	Backup Lamp Control	I	—
15	0.5	PU	5531	Hood Closed Switch Signal	I	—
16	0.35	L-BU	1134	Park Brake Switch Signal	I	—
17	—	—	—	Not Occupied	—	—
18	0.35	TN	28	Horn Relay Control	I	—
19	0.5	YE	5810	Park Enable Signal	I	—
20	0.35	GY	91	Windshield Wiper Motor Relay Coil Control	I	—
21	0.35	TN	860	Front Windshield Wiper Switch High Signal	I	—
22	—	—	—	Not Occupied	—	—
23	0.35	PK/WH	1970	Headlamp Low Beam Relay Control	I	—
24	0.35	D-BU	45	Park Lamp Relay Control	I	—
25	—	—	—	Not Occupied	—	—

K9 Body Control Module X6



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 15482793

Service Connector: 88988842

Description: 25-Way F HIT Series (PK)

Terminal Part Information

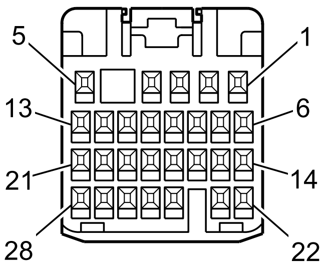
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575870	J-35616-64B (LT BU)	J-38125-12A	SNAC3-A021T-M0.64	Delphi 20	J	J
II	13575871	J-35616-35 (VT)	J-38125-12A	SNAC-A061T-M2.8	Delphi 20	E	A

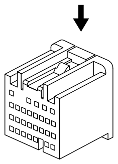
K9 Body Control Module X6

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	—	—	—	Not Occupied	—	—
2	0.8	L-BU	1320	CHMSL Control	II	—
3 - 7	—	—	—	Not Occupied	—	—
8	0.35	TN/WH	746	Right Front Door Ajar Switch Signal	I	—
9	0.35	D-BU	245	Passenger Door Lock Switch Unlock Control	I	—
10	0.35	GY/BK	745	Left Front Door Ajar Switch Signal	I	—
11	—	—	—	Not Occupied	—	—
12	0.35	PK/BK	1303	Lift Gate Ajar Switch Signal 1	I	—
13	—	—	—	Not Occupied	—	—

14	0.35	YE/BK	1181	Right Rear Door Open Switch Signal	I	—
15	—	—	—	Not Occupied	—	—
16	0.35	L-GN	1177	Right Front Door Open Switch Signal	I	—
17	—	—	—	Not Occupied	—	—
18	0.35	L-BU	244	Passenger Door Lock Switch Lock Control	I	—
19 - 21	—	—	—	Not Occupied	—	—
22	0.35	L-GN	5926	Rear Access Open Switch Signal	I	—
23 - 25	—	—	—	Not Occupied	—	—

K9 Body Control Module X7





Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 15466053

Service Connector: 88988806

Description: 28-Way F HIT Series (GY)

Terminal Part Information

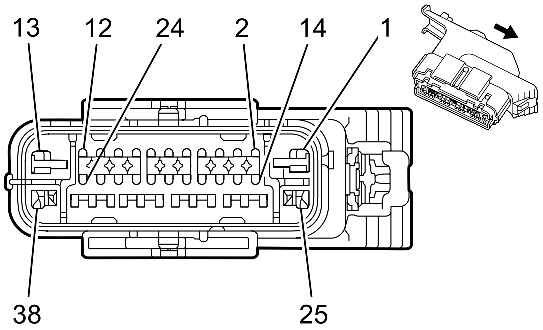
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575870	J-35616-64B (LT BU)	J-38125-12A	SNAC3-A021T-M0.64	Delphi 20	J	J

K9 Body Control Module X7

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	—	—	—	Not Occupied	—	—
2	0.5	YE	356	Driver Door Lock Relay Unlock Control	I	—
3 - 5	—	—	—	Not Occupied	—	—
6	0.5	YE	356	Driver Door Lock Relay Unlock Control	I	—
7	0.5	L-BU	244	Passenger Door Lock Switch Lock Control	I	—
8	—	—	—	Not Occupied	—	—
9	0.5	L-BU	244	Passenger Door Lock Switch Lock Control	I	—
10	—	—	—	Not Occupied	—	—
11	0.5	OG/BK	781	Driver Door Lock Switch Unlock Signal	I	—
12	0.5	PK/BK	780	Driver Door Lock Switch Lock Signal	I	—

13 - 22	—	—	—	Not Occupied	—	—
23	0.5	TN	126	Left Front Door Open Switch Signal	I	—
24	0.5	L-GN	66	A/C Request Signal	I	—
25 - 28	—	—	—	Not Occupied	—	—

K17 Electronic Brake Control Module (JL4)



Connector Part Information

Harness Type: Chassis

OEM Connector: 13528146

Service Connector: 19178085

Description: 38-Way F 0.64, 2.8 GT Series, Sealed (BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575403	J-35616-4A (PU)	J-38125-553	Not Available	Not Available	Not Available	Not Available
II	13578883	J-35616-64B (LT BU)	J-38125-215A	Not Available	Not Available	Not Available	Not Available
III	13578926	J-35616-42 (RD)	J-38125-11A	Not Available	Not Available	Not Available	Not Available

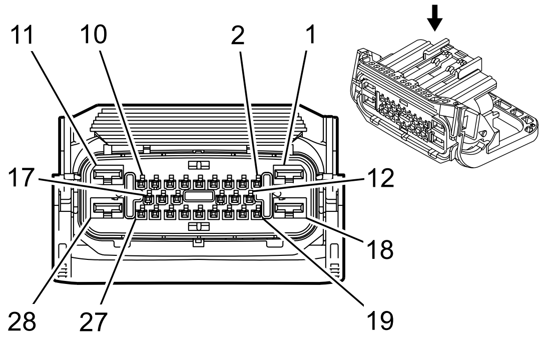
K17 Electronic Brake Control Module (JL4)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	5	BK	2150	Ground	III	—
2	0.5	WH	883	Wheel Speed Sensor Low Reference Right Rear	II	—
3	0.5	BN	882	Wheel Speed Sensor Signal Right Rear	II	—
4	0.5	TN	884	Wheel Speed Sensor Signal Left Rear	II	—
5	0.5	OG	885	Wheel Speed Sensor Low Reference Left Rear	II	—
6	0.5	TN	833	Wheel Speed Sensor Low Reference Right Front	II	—
7	0.5	YE	6046	Steering Angle Sensor Phase A Signal	II	—

8	0.5	TN	6048	Steering Angle Sensor Phase C Signal	II	—
9	0.5	L-GN	6043	Steering Angle Sensor Signal	II	—
10 - 11	—	—	—	Not Occupied	—	—
12	0.5	L-BU	5986	Serial Data Communication Enable	II	—
13	5	RD/BK	442	Battery Positive Voltage	III	—
14 - 15	—	—	—	Not Occupied	—	—
16	0.5	OG/BK	6045	Steering Angle Sensor Low Reference	II	—
17	0.5	D-GN	872	Wheel Speed Sensor Signal Right Front	II	—
18	—	—	—	Not Occupied	—	—
19	0.5	GY/BK	1337	Yaw Rate Sensor 5V Reference	II	—
20	0.5	D-BU	6047	Steering Angle Sensor Phase B Signal	II	—
21	0.5	WH/BK	6436	CAN Bus Low Terminated Serial Data	II	—
22	—	—	—	Not Occupied	—	—
23	0.5	TN	2501	High Speed GMLAN Serial Data (-) 1	II	—
24	0.5	TN	2501	High Speed GMLAN Serial Data (-) 1	II	—
25	3	BK	2150	Ground	I	—
26 - 27	—	—	—	Not Occupied	—	—
28	0.5	L-BU	830	Wheel Speed Sensor Signal Left Front	II	—

29	0.5	YE	873	Left Front Wheel Speed Sensor Low Reference	II	—
30	0.5	BK/PU	7499	Yaw Rate Sensor Low Reference	II	—
31	0.5	GY	6044	Steering Angle Sensor 5V Reference	II	—
32	0.5	D-GN/WH	817	Vehicle Speed Signal	II	—
33	0.5	BN/WH	6437	CAN Bus High Terminated Serial Data	II	—
34 - 35	—	—	—	Not Occupied	—	—
36	0.5	TN/BK	2500	High Speed GMLAN Serial Data (+) 1	II	—
37	0.5	TN/BK	2500	High Speed GMLAN Serial Data (+) 1	II	—
38	3	RD/WH	1640	Battery Positive Voltage	I	—

K17 Electronic Brake Control Module (-JL4)



Connector Part Information

Harness Type: Chassis

OEM Connector: 13628862

Service Connector: 19149286

Description: 28-Way F 0.64, 6.3 Series, Sealed (BK)

Terminal Part Information

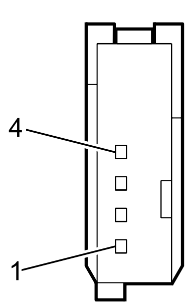
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575439	J-35616-42 (RD)	J-38125-11A	Not Available	Not Available	Not Available	Not Available
II	13578883	J-35616-64B (LT BU)	J-38125-215A	Not Available	Not Available	Not Available	Not Available
III	13578926	J-35616-42 (RD)	J-38125-11A	Not Available	Not Available	Not Available	Not Available

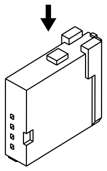
K17 Electronic Brake Control Module (-JL4)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	3	RD/WH	1640	Battery Positive Voltage	I	—
2	0.5	TN/BK	2500	High Speed GMLAN Serial Data (+) 1	II	—
3	0.5	TN/BK	2500	High Speed GMLAN Serial Data (+) 1	II	—
4 - 10	—	—	—	Not Occupied	—	—
11	3	BK	2150	Ground	I	—
12	0.5	TN	2501	High Speed GMLAN Serial Data (-) 1	II	—
13	0.5	TN	2501	High Speed GMLAN Serial Data (-) 1	II	—
14	—	—	—	Not Occupied	—	—

14	—	—	—	Not Occupied	—	—
15	0.5	L-BU	830	Wheel Speed Sensor Signal Left Front	II	—
16	0.5	YE	873	Left Front Wheel Speed Sensor Low Reference	II	—
17	—	—	—	Not Occupied	—	—
18	5	RD/BK	442	Battery Positive Voltage	III	—
19	0.5	L-BU	5986	Serial Data Communication Enable	II	—
20	0.5	YE/BK	1827	Vehicle Speed Signal	II	—
21 - 25	—	—	—	Not Occupied	—	—
26	0.5	D-GN	872	Wheel Speed Sensor Signal Right Front	II	—
27	0.5	TN	833	Wheel Speed Sensor Low Reference Right Front	II	—
28	5	BK	2150	Ground	III	—

K18 Compass Module





Connector Part Information

Harness Type: Headliner

OEM Connector: 13820711

Service Connector: 19300398

Description: 4-Way F 0.64 Series (BK)

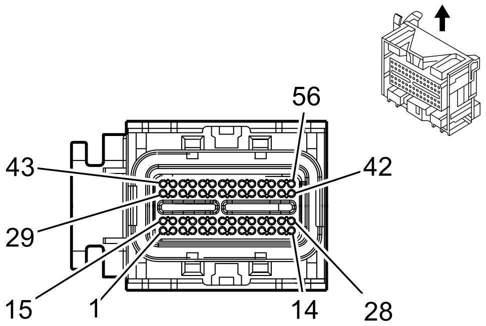
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-64B (LT BU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

K18 Compass Module

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.35	BN	441	Run Ignition 3 Voltage	I	—
2	0.35	BK/WH	351	Signal Ground	I	—
3	0.35	D-GN	6134	Local Interconnect Network Serial Data Bus 3	I	—
4	—	—	—	Not Occupied	—	—

K20 Engine Control Module X1



Connector Part Information

Harness Type: Engine

OEM Connector: 13510837

Service Connector: 88988373

Description: 56-Way F 0.64 Series, Sealed (BU with BU Terminal Position Assurance)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575812	J-35616-64B (LT BU)	J-38125-213	Not Available	Not Available	Not Available	Not Available

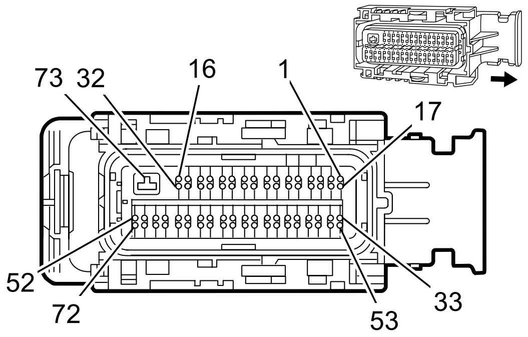
K20 Engine Control Module X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	—	—	—	Not Occupied	—	—
2	0.5	L-BU	1162	Accelerator Pedal Position Signal 2	I	—
3	0.75	L-GN/WH	492	Mass Air Flow Sensor Signal	I	—
4 - 7	—	—	—	Not Occupied	—	—
8	0.75	GY/D-BU	7564	Humidity Sensor Signal	I	—
9	—	—	—	Not Occupied	—	—
10	0.5	D-BU	1161	Accelerator Pedal Position Signal 1	I	—
11	0.75	YE/WH	3200	Throttle Inlet Absolute Pressure Sensor Signal	I	—
12	0.8	OG/BK	380	A/C Refrigerant Pressure Sensor Signal	I	—

13	0.8	TN	5514	A/C Refrigerant Pressure Sensor Low Reference	I	—
14 - 15	—	—	—	Not Occupied	—	—
16	0.5	TN	1274	Accelerator Pedal Position 5V Reference 2	I	—
17	—	—	—	Not Occupied	—	—
18	0.5	D-BU	5985	Accessory Wakeup Serial Data	I	—
19	0.5	PK	439	Run/Crank Ignition 1 Voltage	I	—
20	0.5	RD/WH	440	Battery Positive Voltage	I	—
21 - 23	—	—	—	Not Occupied	—	—
24	0.5	WH/BK	1164	Accelerator Pedal Position 5V Reference 1	I	—
25	0.75	WH/RD	3201	Throttle Inlet Absolute Pressure Sensor 5V Reference	I	—
26	0.8	GY	2700	A/C Pressure Sensor 5V Reference	I	—
27	0.5	YE/BK	625	Starter Enable Relay Control	I	—
28	0.5	D-GN/WH	465	Fuel Pump Primary Relay Control	I	—
29	0.5	TN/BK	2500	High Speed GMLAN Serial Data (+) 1	I	—
30	0.5	PU	1272	Accelerator Pedal Position Low Reference 2	I	—
31	0.75	BK/VT	2760	Intake Air Temperature Sensor Low Reference	I	—
32	0.8	L-BU/BK	6813	Coolant Temperature Sensor 2 Low Reference	I	—
33	0.5	L-BU/WH	6311	Cruise/ETC/TCC Brake Signal	I	—

34	0.5	OG/BK	1786	Transmission Park/Neutral Signal 1	I	—
35 - 37	—	—	—	Not Occupied	—	—
38	0.5	BN	1271	Accelerator Pedal Position Low Reference 1	I	—
39	—	—	—	Not Occupied	—	—
40	0.5	YE	5991	Powertrain Relay Coil Control	I	—
41 - 42	—	—	—	Not Occupied	—	—
43	0.5	TN	2501	High Speed GMLAN Serial Data (-) 1	I	—
44	—	—	—	Not Occupied	—	—
45	0.75	BN/VT	472	Intake Air Temperature Sensor Signal	I	—
46	0.8	L-GN	2032	Coolant Temperature Sensor Signal	I	—
47	0.5	OG	225	Generator Turn On Signal	I	—
48 - 49	—	—	—	Not Occupied	—	—
50	0.5	YE/BK	1827	Vehicle Speed Signal	I	JL9
	0.5	D-GN/WH	817	Vehicle Speed Signal	I	LWN
51	—	—	—	Not Occupied	—	—
52	0.5	BN/WH	419	Check Engine Indicator Control	I	—
53	0.5	D-GN/WH	459	A/C Compressor Clutch Relay Control	I	—
54 - 55	—	—	—	Not Occupied	—	—
56	0.5	WH	1310	EVAP Canister Vent Solenoid Control	I	—

K20 Engine Control Module X2



Connector Part Information

Harness Type: Engine

OEM Connector: 15499466

Service Connector: 88988931

Description: 73-Way F 0.64, 2.8 Series, Sealed (BK with BK Terminal Position Assurance)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575812	J-35616-64B (LT BU)	J-38125-213	Not Available	Not Available	Not Available	Not Available
II	13579770	J-35616-35 (VT)	J-38125-11A	7116-4152-02	Yazaki 9	A	5

K20 Engine Control Module X2

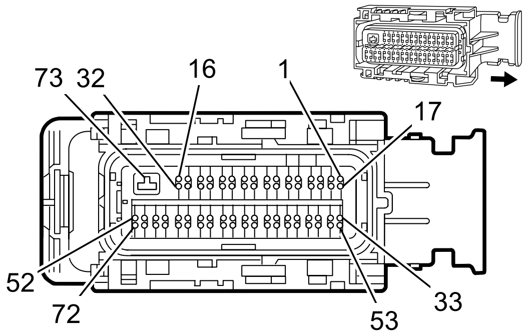
Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.8	PU	2121	Ignition Control 1	I	—
2	0.5	TN	1744	Fuel Injector Control 1	I	—
3	0.5	D-BU/WH	878	Fuel Injector Control 8	I	—
4	0.5	OG/BK	877	Fuel Injector Control 7	I	—
5	0.5	L-GN/BK	1745	Fuel Injector Control 2	I	—
6	0.5	YE/BK	846	Fuel Injector Control 6	I	—
7	0.5	TN/WH	845	Fuel Injector Control 5	I	—

8	0.5	L-BU/BK	844	Fuel Injector Control 4	I	—
9	0.5	PK/BK	1746	Fuel Injector Control 3	I	—
10	—	—	—	Not Occupied	—	—
11	0.8	PU	5284	Camshaft Phaser Intake Solenoid 1	I	—
12 - 14	—	—	—	Not Occupied	—	—
15	0.5	YE	581	Throttle Actuator Control Open	I	—
16	0.5	BN	582	Throttle Actuator Control Close	I	—
17	0.8	PU/WH	2128	Ignition Control 8	I	—
18	0.8	D-GN/WH	2124	Ignition Control 4	I	—
19	0.8	BN/WH	2130	Ignition Control Low Reference Bank 2	I	—
20	0.8	GY/BK	6272	Crankshaft 60X Sensor Low Reference	I	—
21 - 23	—	—	—	Not Occupied	—	—
24	0.8	BN	6266	Camshaft CAM W Ground	I	—
25	0.8	BK	2755	Oil Pressure Sensor Low Reference	I	—
26 - 27	—	—	—	Not Occupied	—	—
28	0.8	PK	1339	Run/Crank Ignition 1 Voltage	I	—
29	0.8	TN	2199	Camshaft Phaser Solenoid Low Reference	I	—
30 - 32	—	—	—	Not Occupied	—	—
33	0.8	OG	2127	Ignition Control 7	I	—

34	0.8	D-GN	2125	Ignition Control 5	I	—
35	0.8	BN	2129	Ignition Control Low Reference Bank 1	I	—
36	0.8	PU/WH	6270	Crankshaft 60X Sensor 5V Reference	I	—
37 - 39	—	—	—	Not Occupied	—	—
40	0.8	D-BU	6259	Camshaft CAM W Control	I	—
41	0.8	GY	2705	Oil Pressure Sensor 5V Reference	I	—
42	—	—	—	Not Occupied	—	—
43	0.5	GY	2701	Throttle Position Sensor 5V Reference	I	—
44	0.5	TN	2752	Throttle Position Sensor Low Reference	I	—
45	0.5	D-GN	485	Throttle Position Sensor Signal 1	I	—
46	—	—	—	Not Occupied	—	—
47	0.8	TN	1664	Heated Oxygen Sensor Low Signal Bank 1 Sensor 1	I	—
48	0.8	TN	1667	Heated Oxygen Sensor Low Signal Bank 2 Sensor 1	I	—
49	0.8	GY	1716	Knock Sensor Low Reference 1	I	—
50	0.8	GY	2303	Knock Sensor Low Reference 2	I	—
51	—	—	—	Not Occupied	—	—
52	0.8	L-GN	3212	Heated Oxygen Sensor Heater Low Control Bank 2 Sensor 1	I	—
53	0.8	OG/WH	2122	Ignition Control 2	I	—

54	0.8	L-BU/WH	2126	Ignition Control 6	I	—
55	0.8	L-BU	2123	Ignition Control 3	I	—
56	0.8	WH/BK	6271	Crankshaft 60X Sensor Signal	I	—
57 - 59	—	—	—	Not Occupied	—	—
60	0.8	D-BU/WH	6265	Camshaft CAM W Signal	I	—
61	0.8	TN/WH	331	Oil Pressure Sensor Signal	I	—
62 - 66	—	—	—	Not Occupied	—	—
67	0.8	PU/WH	1665	Heated Oxygen Sensor High Signal Bank 1 Sensor 1	I	—
68	0.8	PU	1666	Heated Oxygen Sensor High Signal Bank 2 Sensor 1	I	—
69	0.8	D-BU	496	Knock Sensor Signal 1	I	—
70	0.8	L-BU	1876	Knock Sensor Signal 2	I	—
71	—	—	—	Not Occupied	—	—
72	0.8	GY/WH	3113	Heated Oxygen Sensor Heater Low Control Bank 1 Sensor 1	I	—
73	3	BK/WH	1551	Signal Ground	II	—

K20 Engine Control Module X3



Connector Part Information

Harness Type: Engine

OEM Connector: 15497996

Service Connector: 88988372

Description: 73-Way F 0.64, 2.8 Series, Sealed (BK with GY Terminal Position Assurance)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575812	J-35616-64B (LT BU)	J-38125-213	Not Available	Not Available	Not Available	Not Available

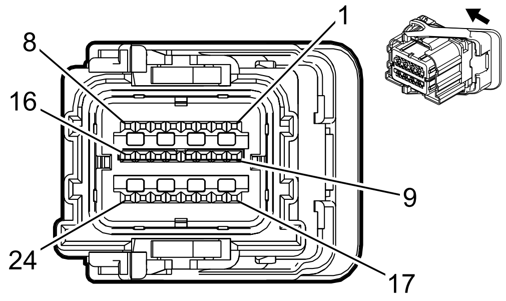
K20 Engine Control Module X3

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1 - 9	—	—	—	Not Occupied	—	—
10	0.5	D-GN/WH	428	EVAP Canister Purge Solenoid Control	I	—
11 - 15	—	—	—	Not Occupied	—	—
16	0.8	OG/WH	3223	Heated Oxygen Sensor Heater Low Control Bank 2 Sensor 2	I	—
17	0.5	GY	23	Generator Field Duty Cycle Signal	I	—
18 - 21	—	—	—	Not Occupied	—	—
22	0.5	BN	5360	Brake Apply Sensor Low Reference	I	—
23 - 26	—	—	—	Not Occupied	—	—
27	0.5	TN	2759	Fuel Tank Pressure Sensor Low Reference	I	—
28	0.8	GY	2704	Manifold Absolute Pressure Sensor 5V Reference	I	—

29	0.8	OG/BK	469	Manifold Absolute Pressure Sensor Low Reference	I	—
30	0.8	TN	2761	Coolant Temperature Sensor Low Reference	I	—
31	—	—	—	Not Occupied	—	—
32	0.8	GY/WH	3122	Heated Oxygen Sensor Heater Low Control Bank 1 Sensor 2	I	—
33	—	—	—	Not Occupied	—	—
34	0.8	WH	1579	Fuel Temperature/Composition Signal	I	—
35 - 37	—	—	—	Not Occupied	—	—
38	0.5	WH	5359	Brake Apply Sensor Control	I	—
39 - 42	—	—	—	Not Occupied	—	—
43	0.5	GY	2709	Fuel Tank Pressure Sensor 5V Reference	I	—
44	—	—	—	Not Occupied	—	—
45	0.8	L-GN	432	Manifold Absolute Pressure Sensor Signal	I	—
46	0.8	YE	410	Engine Coolant Temperature Sensor Signal	I	—
47 - 54	—	—	—	Not Occupied	—	—
55	0.5	OG/BK	6399	Replicated TOS Signal	I	—
56 - 57	—	—	—	Not Occupied	—	—
58	0.5	YE	5361	Brake Apply Sensor Signal	I	—
59 - 62	—	—	—	Not Occupied	—	—
63	0.5	D-GN	890	Fuel Tank Pressure Sensor Signal	I	—
64	0.5	PU	1589	Primary Fuel Level Sensor Signal	I	—

65	0.8	PU	1670	Heated Oxygen Sensor High Signal Bank 2 Sensor 2	I	—
66	0.8	TN	1671	Heated Oxygen Sensor Low Signal Bank 2 Sensor 2	I	—
67	0.8	PU/WH	1668	Heated Oxygen Sensor High Signal Bank 1 Sensor 2	I	—
68	0.8	TN/WH	1669	Heated Oxygen Sensor Low Signal Bank 1 Sensor 2	I	—
69 - 73	—	—	—	Not Occupied	—	—

K36 Inflatable Restraint Sensing and Diagnostic Module X1



Connector Part Information

Harness Type: Body

OEM Connector: 13859806

Service Connector: 13579314

Description: 24-Way F 0.64 Series, Sealed (YE)

Terminal Part Information

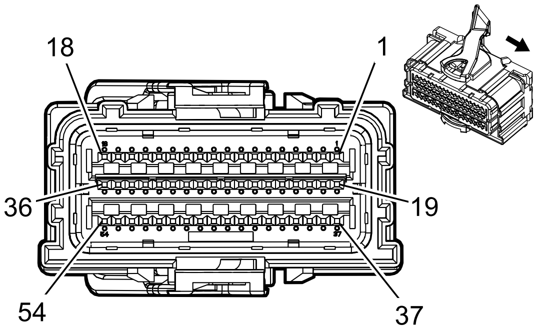
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	19328872	J-35616-64B (LT BU)	J-38125-11A	Not Available	Not Available	Not Available	Not Available

K36 Inflatable Restraint Sensing and Diagnostic Module X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1 - 2	—	—	—	Not Occupied	—	—
3	0.5	BN	3020	Steering Wheel Module Stage 1 Low Control	I	—
4	0.5	TN	3021	Steering Wheel Module Stage 1 High Control	I	—
5	0.5	YE	3025	Passenger IP Module Stage 1 High Control	I	—
6	0.5	OG	3024	Passenger IP Module Stage 1 Low Control	I	—
7 - 8	—	—	—	Not Occupied	—	—
9	0.5	RD/WH	3440	Battery Positive Voltage	I	—
10 - 12	—	—	—	Not Occupied	—	—
13	0.5	PK	353	Passenger IP Module Suppression Indicator Control	I	—

14	0.5	TN/BK	371	Passenger IP Module Disable Switch Signal	I	—
15	0.35	D-GN	5060	Low Speed GMLAN Serial Data	I	—
16	—	—	—	Not Occupied	—	—
17	0.35	PK	1139	Run/Crank Ignition 1 Voltage	I	—
18	—	—	—	Not Occupied	—	—
19	0.5	BK/WH	1751	Signal Ground	I	—
20 - 24	—	—	—	Not Occupied	—	—

K36 Inflatable Restraint Sensing and Diagnostic Module X2



Connector Part Information

Harness Type: Body

OEM Connector: 13914358

Service Connector: 19301526

Description: 54-Way F 0.64 Series, Sealed (YE)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	19328872	J-35616-64B (LT BU)	J-38125-11A	Not Available	Not Available	Not Available	Not Available

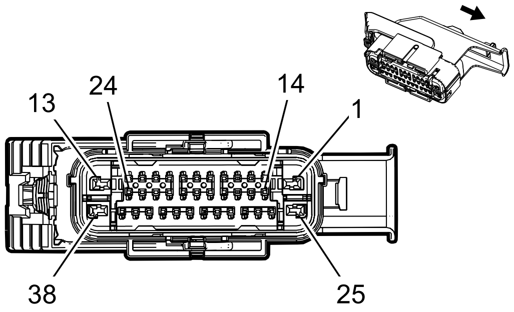
K36 Inflatable Restraint Sensing and Diagnostic Module X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1 - 10	—	—	—	Not Occupied	—	—
11	0.5	TN/BK	7016	Right Rear Head Curtain Module Low Control	I	—
12	0.5	L-BU	7015	Right Rear Head Curtain Module High Control	I	—
13	0.5	BN	2137	Left Front Side Impact Module High Control	I	—
14	0.5	YE/BK	2138	Left Front Side Impact Module Low Control	I	—
15	0.5	L-GN	2136	Right Front Side Impact Module Low Control	I	—
16	0.5	TN/WH	2135	Right Front Side Impact Module High Control	I	—
17	0.5	PU/WH	5019	Left Front Head Curtain Module High Control	I	—

18	0.5	PK	5020	Left Front Head Curtain Module Low Control	I	—
19	0.5	WH	2132	Left Front Side Impact Sensing Module Signal	I	—
20	0.5	PU/WH	6628	Left Front Side Impact Sensing Module Low Reference	I	—
21	0.5	WH/BK	6629	Right Front Side Impact Sensing Module Low Reference	I	—
22	0.5	D-GN	2134	Right Front Side Impact Sensing Module Signal	I	—
23 - 24	—	—	—	Not Occupied	—	—
25	0.5	D-BU/WH	6619	Middle Front Discriminating Sensor Low Reference	I	—
26	0.5	BN/WH	6618	Middle Front Discriminating Sensor Signal	I	—
27	0.5	D-GN/WH	6620	Left Middle Side Impact Sensing Module Signal	I	—
28	0.5	GY/BK	6621	Left Middle Side Impact Sensing Module Low Reference	I	—
29	0.5	L-GN/WH	6625	Right Middle Side Impact Sensing Module Low Reference	I	—
30	0.5	L-BU/BK	6624	Right Middle Side Impact Sensing Module Signal	I	—
31 - 36	—	—	—	Not Occupied	—	—
37	0.5	TN/WH	2118	Driver Seat Belt Pretensioner High Control	I	—
38	0.5	OG/BK	2119	Driver Seat Belt Pretensioner Low Control	I	—
39	0.5	OG	2117	Passenger Seat Belt Pretensioner Low Control	I	—
40	0.5	L-GN	2116	Passenger Seat Belt Pretensioner High Control	I	—

41	0.5	TN/WH	238	Driver Seat Belt Switch Signal	I	—
42	—	—	—	Not Occupied	—	—
43	0.5	PK	5057	Seat Position Switch Low Reference	I	—
44 - 52	—	—	—	Not Occupied	—	—
53	0.5	YE/BK	5021	Right Front Head Curtain Module High Control	I	—
54	0.5	WH/BK	5022	Right Front Head Curtain Module Low Control	I	—

K38 Chassis Control Module



Connector Part Information

Harness Type: Chassis

OEM Connector: 13638773

Service Connector: 13574909

Description: 38-Way F 0.64, 2.8, 6.3 Series, Sealed (BK)

Terminal Part Information

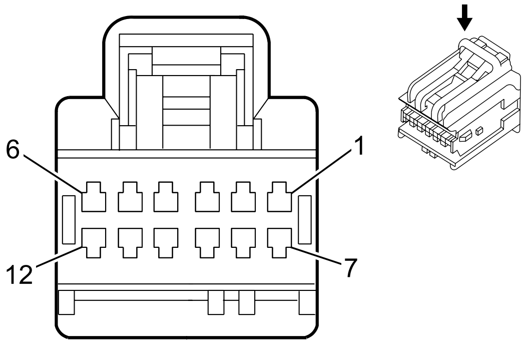
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575408	J-35616-4A (PU)	J-38125-553	Not Available	Not Available	Not Available	Not Available
II	13578924	J-35616-64B (LT BU)	J-38125-215A	Not Available	Not Available	Not Available	Not Available

K38 Chassis Control Module

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	3	RD/WH	1940	Battery Positive Voltage	I	—
2 - 4	—	—	—	Not Occupied	—	—
5	0.5	TN/BK	2500	High Speed GMLAN Serial Data (+) 1	II	—
6	0.5	TN/BK	2500	High Speed GMLAN Serial Data (+) 1	II	—
7	—	—	—	Not Occupied	—	—
8	0.5	D-BU	5985	Accessory Wakeup Serial Data	II	—
9	—	—	—	Not Occupied	—	—
10	0.5	PU	7446	Fuel Line Pressure Sensor Signal	II	—
11 - 12	—	—	—	Not Occupied	—	—

13	2.5	GY	120	Fuel Pump Control	I	—
14 - 16	—	—	—	Not Occupied	—	—
17	0.5	TN	2501	High Speed GMLAN Serial Data (-) 1	II	—
18	0.5	TN	2501	High Speed GMLAN Serial Data (-) 1	II	—
19	—	—	—	Not Occupied	—	—
20	0.5	D-GN/WH	465	Fuel Pump Primary Relay Control	II	—
21	0.5	PK	2739	Run/Crank Ignition 1 Voltage	II	—
22	0.5	BN	7445	Fuel Line Pressure Sensor 5V Reference	II	—
23	0.5	GY	7447	Fuel Line Pressure Sensor Low Reference	II	—
24	0.5	BK	514	Low Reference	II	KI4
	0.5	BK	1350	Ground	II	L20/L96/LC8-LGH
25	2	BK	2150	Ground	I	—
26 - 37	—	—	—	Not Occupied	—	—
38	2.5	BK/L-GN	1580	Fuel Pump Low Reference	I	—

K41R Rear Parking Assist Control Module X1



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 13784026

Service Connector: 13578574

Description: 12-Way F 0.64 Series (BK)

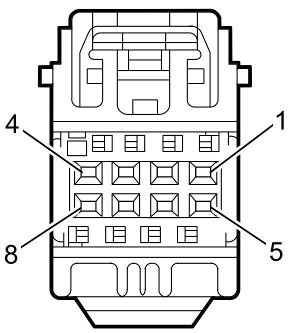
Terminal Part Information

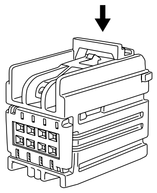
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575549	J-35616-16 (LT GN)	J-38125-559	15445905	Delphi 23	J	J

K41R Rear Parking Assist Control Module X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	RD/WH	840	Battery Positive Voltage	I	—
2 - 5	—	—	—	Not Occupied	—	—
6	0.35	D-GN	5060	Low Speed GMLAN Serial Data	I	—
7	0.5	BK/WH	351	Signal Ground	I	—
8 - 12	—	—	—	Not Occupied	—	—

K41R Rear Parking Assist Control Module X2





Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 13551679

Service Connector: 19115653

Description: 8-Way F YESC Kaizen Series (L-GY)

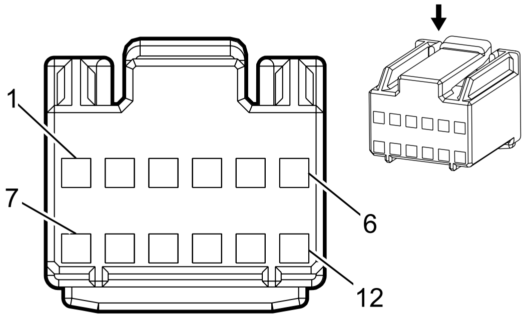
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-64B (LT BU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

K41R Rear Parking Assist Control Module X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	PU	2378	Right Rear Corner Object Sensor Signal	I	—
2	0.5	D-GN	2377	Right Rear Middle Object Sensor Signal	I	—
3	0.5	OG	2376	Left Rear Middle Object Sensor Signal	I	—
4	0.5	D-BU	2374	Object Sensor Control	I	—
5	0.5	YE	2375	Left Rear Corner Object Sensor Signal	I	—
6 - 7	—	—	—	Not Occupied	—	—
8	0.5	GY	2379	Object Sensor Low Reference	I	—

K73 Telematics Communication Interface Control Module X1



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 15431365

Service Connector: 88952886

Description: 12-Way F 100A Micro-Pack Series (NA)

Terminal Part Information

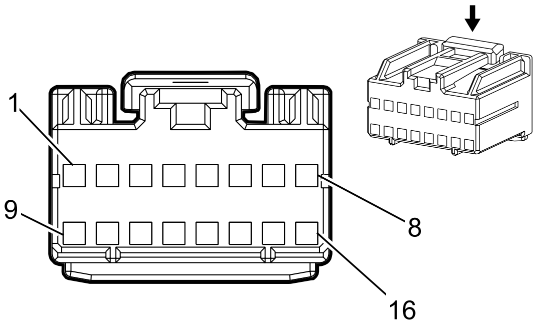
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575548	J-35616-16 (LT GN)	J-38125-559	15445905	Delphi 23	J	J
II	13575548	J-35616-16 (LT GN)	J-38125-559	15445905	Delphi 23	K	K

K73 Telematics Communication Interface Control Module X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.8	D-BU	658	Cellular Telephone Voice Signal	II	UE1-UL5-UI8
	0.35	D-BU	658	Cellular Telephone Voice Signal	I	UI8+UE1
2	0.8	L-BU/BK	659	Cellular Telephone Voice Low Reference	II	UE1-UL5-UI8
	0.35	L-BU/BK	659	Cellular Telephone Voice Low Reference	I	UI8+UE1
3	0.5	TN/BK	2500	High Speed GMLAN Serial Data (+) 1	I	—
4	0.5	TN	2501	High Speed GMLAN Serial Data (-) 1	I	—
5	0.35	BARE	1792	Low Reference	I	—
6	0.35	PK	5149	Voice Recognition Audio Signal	I	—

7	—	—	—	Not Occupied	—	—
8	0.8	BARE	1792	Low Reference	II	UI1-UL5-UI8
	0.35	BARE	1782	Low Reference	I	UI8+UE1
9	0.8	GY	655	Cellular Telephone Microphone Signal	II	—
10	0.8	D-GN	654	Cellular Telephone Microphone Low Reference	II	—
11	—	—	—	Not Occupied	—	—
12	0.35	PK/BK	5152	Voice Recognition Audio Low Reference	I	—

K73 Telematics Communication Interface Control Module X2



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 15431362

Service Connector: 15306351

Description: 16-Way F 100A Micro-Pack Series (NA)

Terminal Part Information

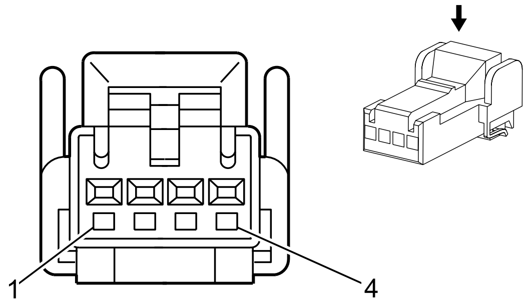
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575548	J-35616-16 (LT GN)	J-38125-559	15445905	Delphi 23	J	J
II	13575548	J-35616-16 (LT GN)	J-38125-559	15445905	Delphi 23	K	K

K73 Telematics Communication Interface Control Module X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	D-GN	5060	Low Speed GMLAN Serial Data	I	—
2	0.8	BN/WH	2517	Keypad Red LED Control	II	—
3	0.8	YE/BK	2516	Keypad Green LED Control	II	—
4 - 5	—	—	—	Not Occupied	—	—
6	0.8	L-GN/BK	2515	Keypad Control	II	—
7	0.8	BK/WH	351	Signal Ground	II	—
8 - 9	—	—	—	Not Occupied	—	—
10	0.5	D-BU	2500	High Speed GMLAN Serial Data (+) 1	I	—

11	0.8	D-GN/WH	2514	Keypad Signal	II	—
12	0.5	WH	2501	High Speed GMLAN Serial Data (-) 1	I	—
13 - 14	—	—	—	Not Occupied	—	—
15	0.8	RD/WH	3240	Battery Positive Voltage	II	—
16	—	—	—	Not Occupied	—	—

K77 Remote Control Door Lock Receiver



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 15462684

Service Connector: 13585474

Description: 4-Way F IL-AG5 Series (GN)

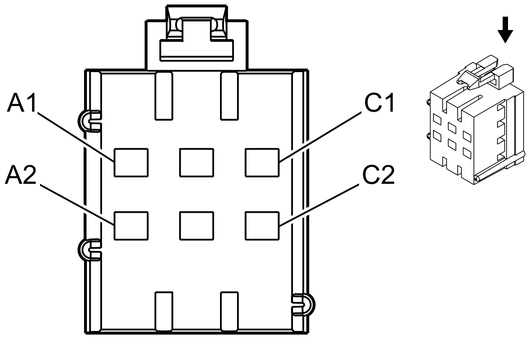
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-64B (LT BU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

K77 Remote Control Door Lock Receiver

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	RD/WH	5340	Battery Positive Voltage	I	—
2	0.35	D-GN	5060	Low Speed GMLAN Serial Data	I	—
3	—	—	—	Not Occupied	—	—
4	0.35	BK/WH	351	Signal Ground	I	—

KR32B Blower Motor High Speed Relay - Auxiliary



Connector Part Information

Harness Type: Auxiliary HVAC

OEM Connector: 12129715

Service Connector: Service by Harness - See Part Catalog

Description: 6-Way F 280 Metri-Pack Flexlock Series (GY)

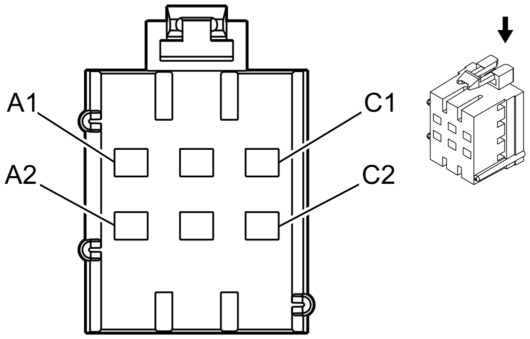
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

KR32B Blower Motor High Speed Relay - Auxiliary

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A1	0.35	WH	1924	Auxiliary Blower Motor High Speed Control	I	—
A2	5	YE	1172	Auxiliary Blower Motor Control	I	—
B1 - B2	—	—	—	Not Occupied	—	—
C1	5	RD/WH	1740	Battery Positive Voltage	I	—
C2	0.35	BN	341	Run Ignition 3 Voltage	I	—

KR32C Blower Motor Low Speed Relay - Auxiliary



Connector Part Information

Harness Type: Auxiliary HVAC

OEM Connector: 12129715

Service Connector: Service by Harness - See Part Catalog

Description: 6-Way F 280 Metri-Pack Flexlock Series (GY)

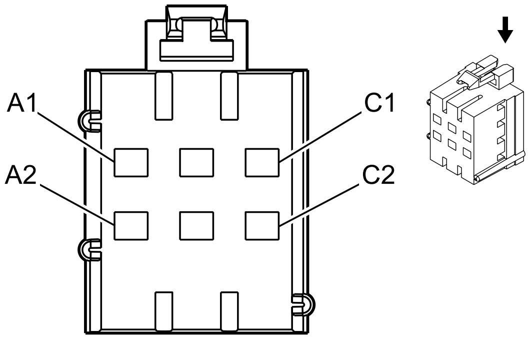
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

KR32C Blower Motor Low Speed Relay - Auxiliary

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A1	0.35	D-BU	1926	Auxiliary Blower Motor Low Speed Control	I	—
A2	3	YE	1176	Auxiliary Blower Motor Low Speed Control	I	—
B1 - B2	—	—	—	Not Occupied	—	—
C1	5	RD/WH	1740	Battery Positive Voltage	I	—
C2	0.35	BN	341	Run Ignition 3 Voltage	I	—

KR32D Blower Motor Medium Speed Relay - Auxiliary



Connector Part Information

Harness Type: Auxiliary HVAC

OEM Connector: 12129715

Service Connector: Service by Harness - See Part Catalog

Description: 6-Way F 280 Metri-Pack Flexlock Series (GY)

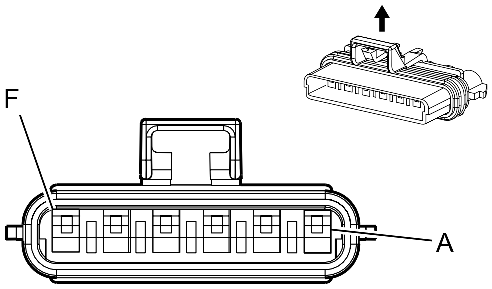
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

KR32D Blower Motor Medium Speed Relay - Auxiliary

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A1	0.35	OG	1925	Auxiliary Blower Motor Medium Speed Control	I	—
A2	3	L-BU	1072	Auxiliary Blower Motor Medium Speed Control	I	—
B1 - B2	—	—	—	Not Occupied	—	—
C1	5	RD/WH	1740	Battery Positive Voltage	I	—
C2	0.35	BN	341	Run Ignition 3 Voltage	I	—

KR32E Blower Motor Relay



Connector Part Information

Harness Type: Engine

OEM Connector: 12160746

Service Connector: 15306007

Description: 6-Way F 280 Metri-Pack Flexlock Series, Sealed (L-GY)

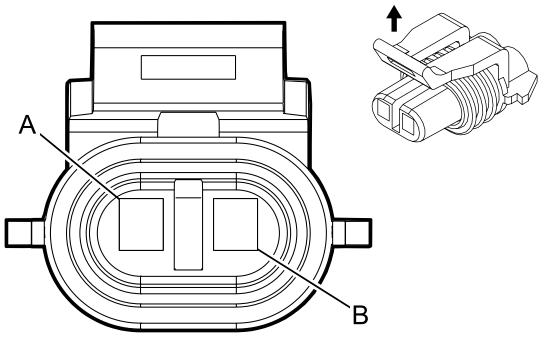
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

KR32E Blower Motor Relay

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	5	RD/BK	542	Battery Positive Voltage	I	—
B	0.8	OG	52	High Blower Motor Control	I	—
C	5	BK	1250	Ground	I	—
D	0.8	TN	63	Medium Blower Motor Control 1	I	—
E	0.8	YE	60	Low Blower Motor Control	I	—
F	2	L-BU	72	Medium 2 Blower Motor Control	I	—

KR81 Auxiliary Battery Relay 1



Connector Part Information

Harness Type: Engine

OEM Connector: 12052641

Service Connector: 13586114

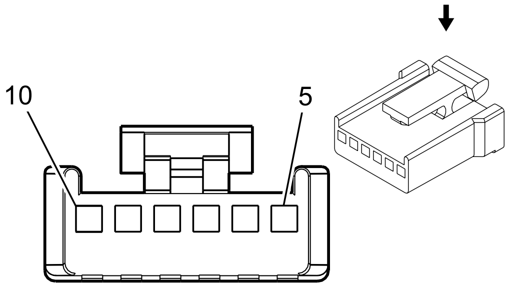
Description: 2-Way F 150 Metri-Pack Series (BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

KR81 Auxiliary Battery Relay 1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.5	RD/WH	4892	Auxiliary Battery Relay Control	I	—
B	0.5	BK/WH	1551	Signal Ground	I	—



Connector Part Information

Harness Type: Auxiliary HVAC

OEM Connector: 12040953

Service Connector: Service by Harness - See Part Catalog

Description: 6-Way F 100 Micro-Pack Series (BK)

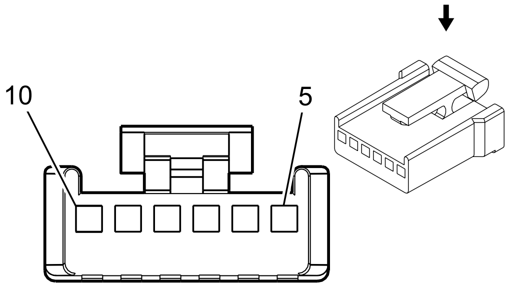
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-6 (BN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

M6B Air Temperature Door Actuator - Auxiliary

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
5 - 6	—	—	—	Not Occupied	—	—
7	0.35	BK	850	Ground	I	—
8	0.35	OG	2775	Rear Air Temperature Motor Control	I	—
9	—	—	—	Not Occupied	—	—
10	0.35	BN	341	Run Ignition 3 Voltage	I	—

M6 Air Temperature Door Actuator



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 12040953

Service Connector: 12102632

Description: 6-Way F 100 Micro-Pack Series (BK)

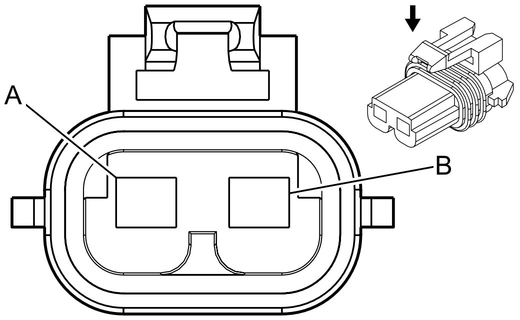
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-6 (BN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

M6 Air Temperature Door Actuator

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
5 - 6	—	—	—	Not Occupied	—	—
7	1	BK	550	Ground	I	—
8	0.8	L-BU	733	Air Temperature Door Position Signal	I	—
9	—	—	—	Not Occupied	—	—
10	0.35	BN	341	Run Ignition 3 Voltage	I	—

M8B Blower Motor - Auxiliary



Connector Part Information

Harness Type: Auxiliary HVAC

OEM Connector: 12077900

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F 280 Metri-Pack Series, Sealed (BK)

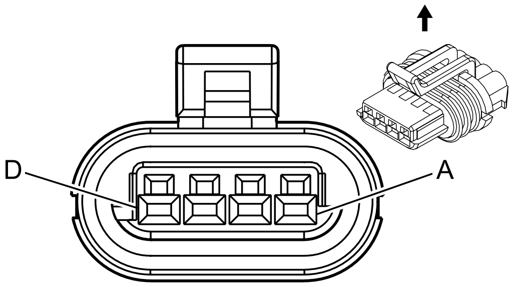
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

M8B Blower Motor - Auxiliary

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	5	BK	850	Ground	I	—
B	5	YE	1172	Auxiliary Blower Motor Control	I	—

M13 Door Latch Assembly - Rear Cargo X1



Connector Part Information

Harness Type: Right Rear Cargo Door

OEM Connector: 15336846

Service Connector: Service by Harness - See Part Catalog

Description: 4-Way F 150 GT Series, Sealed (BU)

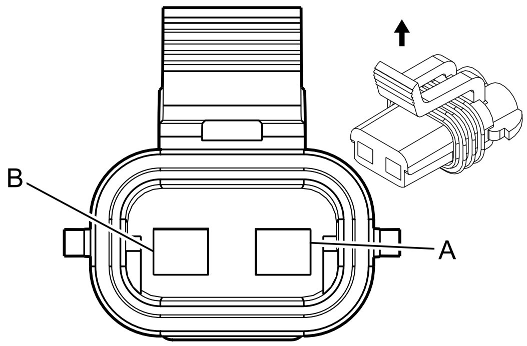
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

M13 Door Latch Assembly - Rear Cargo X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.35	BK/WH	1051	Signal Ground	I	—
B	—	—	—	Not Occupied	—	—
C	0.35	PK/BK	1303	Lift Gate Ajar Switch Signal 1	I	—
D	0.35	L-GN	5926	Rear Access Open Switch Signal	I	—

M13 Door Latch Assembly - Rear Cargo X2



Connector Part Information

Harness Type: Right Rear Cargo Door

OEM Connector: 15300027

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F 280 Metri-Pack Series, Sealed (BK)

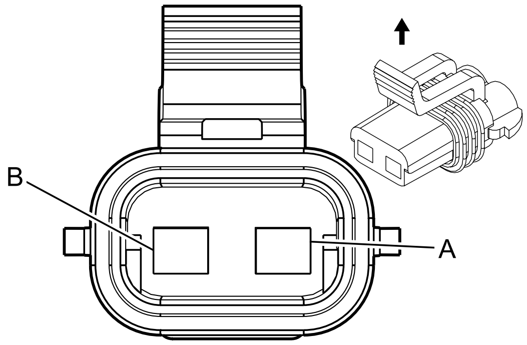
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

M13 Door Latch Assembly - Rear Cargo X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	1	TN/BK	1095	Right Rear Door Lock Actuator Unlock Control	I	—
B	1	GY	295	Door Lock Actuator Lock Control	I	—

M14RR Door Lock Actuator - Right Rear X1



Connector Part Information

Harness Type: Right Rear Door

OEM Connector: 15300027

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F 280 Metri-Pack Series, Sealed (BK)

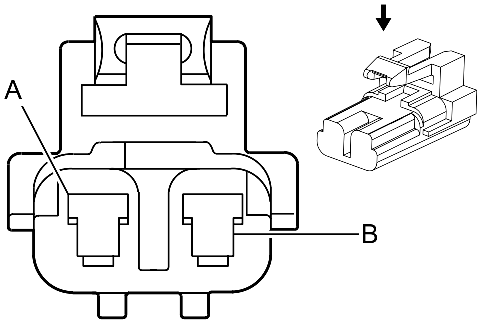
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

M14RR Door Lock Actuator - Right Rear X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	TN	294	Door Lock Actuator Unlock Control	I	—
B	0.8	GY	295	Door Lock Actuator Lock Control	I	—

M14RR Door Lock Actuator - Right Rear X2



Connector Part Information

Harness Type: Right Rear Door

OEM Connector: 12084957

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F 280 Metri-Pack Series (BK)

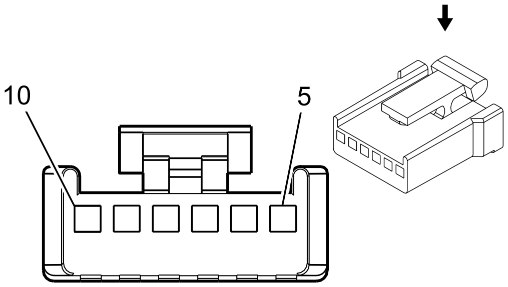
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

M14RR Door Lock Actuator - Right Rear X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	GY	295	Door Lock Actuator Lock Control	I	—
B	0.8	TN	294	Door Lock Actuator Unlock Control	I	—

M37B Mode Door Actuator - Auxiliary



Connector Part Information

Harness Type: Auxiliary HVAC

OEM Connector: 12040953

Service Connector: Service by Harness - See Part Catalog

Description: 6-Way F 100 Micro-Pack Series (BK)

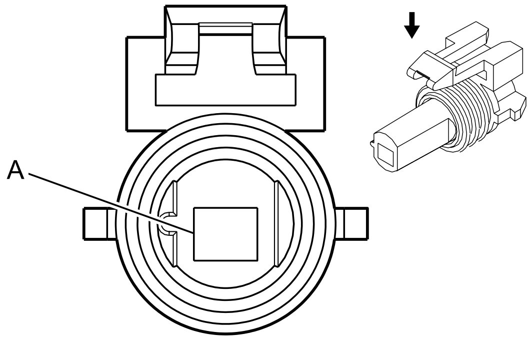
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-6 (BN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

M37B Mode Door Actuator - Auxiliary

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
5 - 6	—	—	—	Not Occupied	—	—
7	0.35	BK	850	Ground	I	—
8	0.35	GY	2599	Rear Mode Motor Signal	I	—
9	—	—	—	Not Occupied	—	—
10	0.35	BN	341	Run Ignition 3 Voltage	I	—

M64 Starter Motor X2



Connector Part Information

Harness Type: Engine

OEM Connector: 15481001

Service Connector: 13584479

Description: 1-Way F 280 Metri-Pack Series, Sealed (BK)

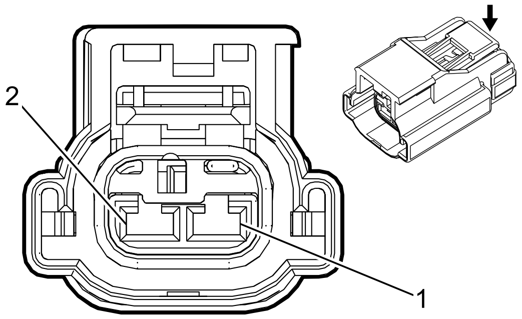
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

M64 Starter Motor X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	5	PU	6	Starter Solenoid Crank Ignition Voltage	I	—

M74D Window Motor - Driver



Connector Part Information

Harness Type: Driver Door

OEM Connector: 13896059

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F 2.8 APEX Series, Sealed (BK)

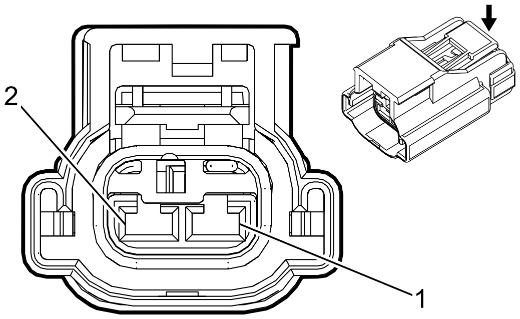
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-35 (VT)	No Tool Required	Not Required	Not Required	Not Required	Not Required

M74D Window Motor - Driver

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	3	D-BU	164	Power Window Motor Left Front Up Control	I	—
2	3	BN	165	Power Window Motor Left Front Down Control	I	—

M74P Window Motor - Passenger



Connector Part Information

Harness Type: Passenger Door

OEM Connector: 13896059

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F 2.8 APEX Series, Sealed (BK)

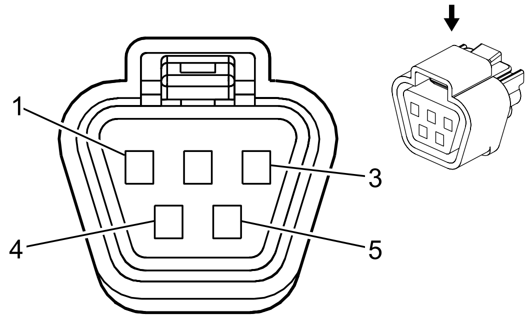
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-35 (VT)	No Tool Required	Not Required	Not Required	Not Required	Not Required

M74P Window Motor - Passenger

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	3	D-BU	666	Power Window Motor Right Front Up Control	I	—
2	3	BN	667	Power Window Motor Right Front Down Control	I	—

M75 Windshield Wiper Motor



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 15316488

Service Connector: 13587179

Description: 5-Way F 090 Series, Sealed (GY)

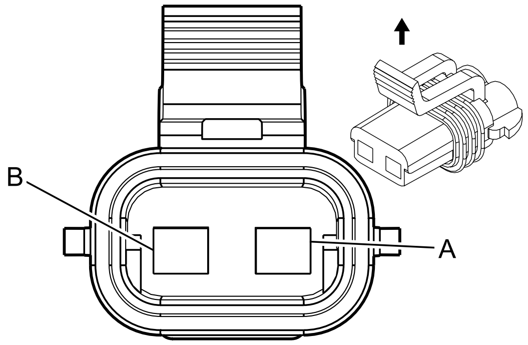
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-18 (BK)	No Tool Required	Not Required	Not Required	Not Required	Not Required

M75 Windshield Wiper Motor

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	2	D-GN	95	Windshield Wiper Motor Low Speed Control	II	—
2	0.35	BK/WH	351	Signal Ground	I	—
3	0.35	YE	196	Windshield Wiper Motor Park Switch Signal	I	—
4	2	PU	92	Windshield Wiper Motor High Speed Control	II	—
5	2	BK	1250	Ground	II	—

P3 Backup Alarm (8S3)



Connector Part Information

Harness Type: Chassis

OEM Connector: 15300027

Service Connector: 12101855

Description: 2-Way F 280 Metri-Pack Series, Sealed (BK)

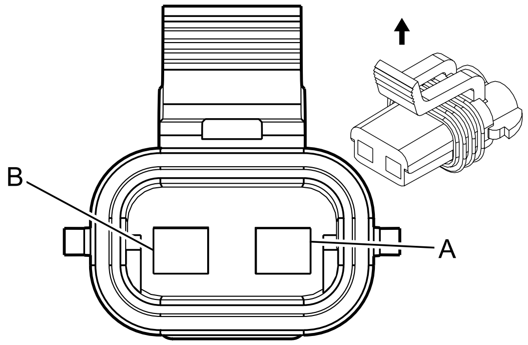
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

P3 Backup Alarm (8S3)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	1	L-GN	1624	Trailer Backup Lamp Control	I	—
B	1	BK	150	Ground	I	—

P3 Backup Alarm (Cutaway)



Connector Part Information

Harness Type: Cutaway Jumper

OEM Connector: 15300027

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F 280 Metri-Pack Series, Sealed (BK)

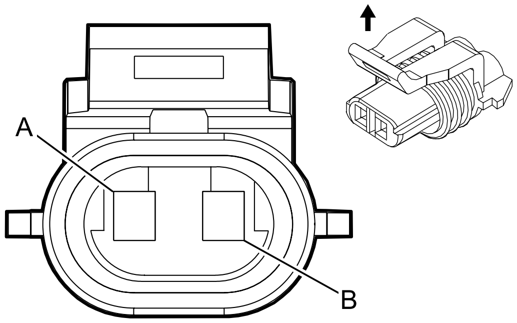
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

P3 Backup Alarm (Cutaway)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	1	L-GN	1624	Trailer Backup Lamp Control	I	—
B	1	BK	150	Ground	I	—

P13 Horn Assembly



Connector Part Information

Harness Type: Engine

OEM Connector: 12052644

Service Connector: 15306302

Description: 2-Way F 150 Metri-Pack Series, Sealed (GY)

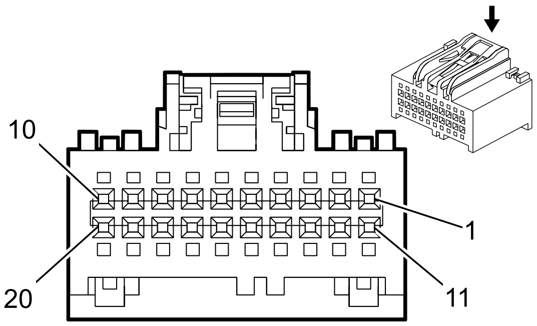
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

P13 Horn Assembly

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	BK	1250	Ground	I	—
B	0.8	D-GN	29	Horn Control	I	—

P16 Instrument Cluster



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 15489824

Service Connector: 15126711

Description: 20-Way F 0.64 Series (BK)

Terminal Part Information

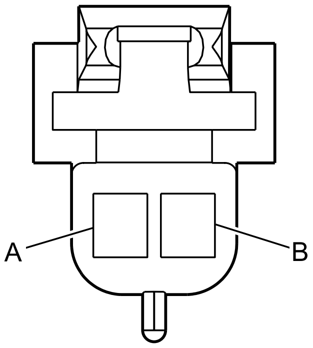
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575867	J-35616-64B (LT BU)	J-38125-215A	SAIT-A03T-M064	Yazaki 14	P	P

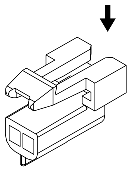
P16 Instrument Cluster

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.35	D-GN	5060	Low Speed GMLAN Serial Data	I	—
2	—	—	—	Not Occupied	—	—
3	0.5	L-GN	1478	Coolant Level Switch Signal	I	—
4	0.5	BN/WH	419	Check Engine Indicator Control	I	—
5 - 6	—	—	—	Not Occupied	—	—
7	0.35	BK/WH	351	Signal Ground	I	—
8	—	—	—	Not Occupied	—	—
9	0.5	L-GN/BN	507	Wait To Start Indicator Control	I	—
10	0.5	D-GN/WH	636	Outside Ambient Air Temperature Sensor Signal	I	—

11	0.5	YE	61	Outside Ambient Temperature Sensor Low Reference	I	—
12	0.35	D-BU	2307	Passenger Air Bag On Indicator Control	I	—
13	0.35	D-GN	2308	Passenger Air Bag Off Indicator Control	I	—
14	0.5	TN/WH	33	Brake Warning Indicator Control	I	—
15	0.5	PU	333	Brake Fluid Level Sensor Signal	I	—
16	0.35	PK	893	Driver Information Center Select Menu Switch Signal	I	—
17	0.35	D-GN/WH	1358	Driver Information Center Switch Signal	I	—
18	0.35	BN	897	Driver Information Center Switch Low Reference	I	—
19	0.35	PK	1639	Run/Crank Ignition 1 Voltage	I	—
20	0.35	RD/WH	2840	Battery Positive Voltage	I	—

P19AG Speaker - Left Front Door





Connector Part Information

Harness Type: Driver Door

OEM Connector: 12052832

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F 150 Metri-Pack Series (BK)

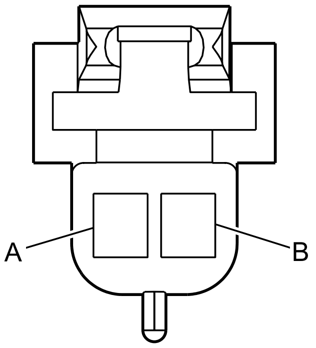
Terminal Part Information

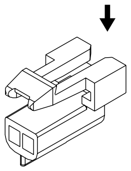
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

P19AG Speaker - Left Front Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	L-BU	1957	Left Front Midrange Speaker (-) Low Reference	I	—
B	0.8	D-BU	1857	Left Front Midrange Speaker Control (+)	I	—

P19AH Speaker - Right Front Door





Connector Part Information

Harness Type: Passenger Door

OEM Connector: 12052832

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F 150 Metri-Pack Series (BK)

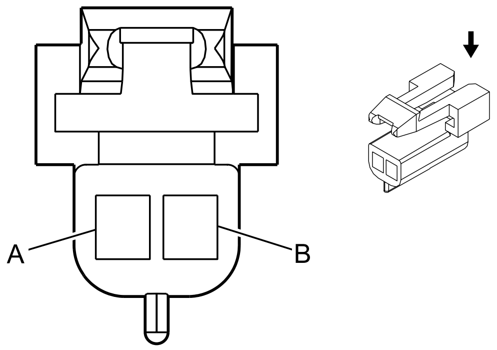
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

P19AH Speaker - Right Front Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	D-GN	1953	Right Front Midrange Speaker (-) Low Reference	I	—
B	0.8	OG	1853	Right Front Midrange Speaker Control (+)	I	—

P19F Speaker - Left Rear Cargo Door



Connector Part Information

Harness Type: Left Rear Cargo Door

OEM Connector: 12052832

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F 150 Metri-Pack Series (BK)

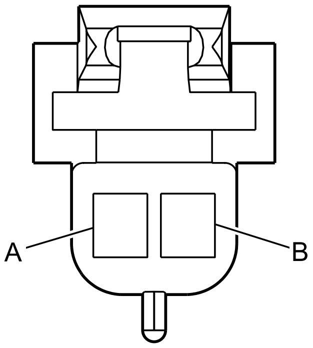
Terminal Part Information

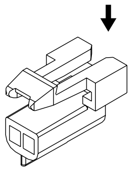
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

P19F Speaker - Left Rear Cargo Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	1	WH	1959	Left Rear Midrange Speaker (-) Low Reference	I	—
B	1	TN	1859	Left Rear Midrange Speaker Control (+)	I	—

P19T Speaker - Right Rear Cargo Door





Connector Part Information

Harness Type: Right Rear Cargo Door

OEM Connector: 12052832

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F 150 Metri-Pack Series (BK)

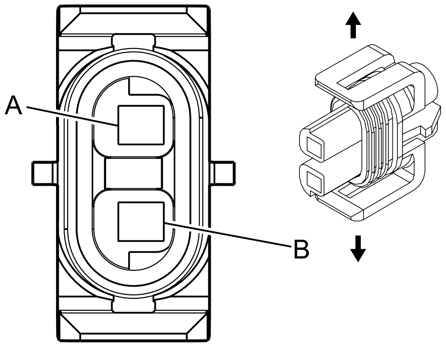
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

P19T Speaker - Right Rear Cargo Door

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	1	OG	1955	Right Rear Midrange Speaker (-) Low Reference	I	—
B	1	TN	1855	Right Rear Midrange Speaker Control (+)	I	—

Q2 A/C Compressor Clutch



Connector Part Information

Harness Type: Engine

OEM Connector: 12162017

Service Connector: 12101937

Description: 2-Way F 150 Metri-Pack Series, Sealed (GY)

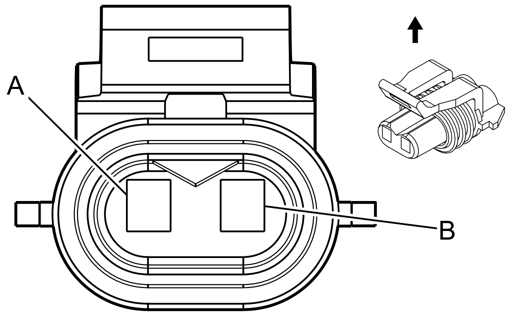
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

Q2 A/C Compressor Clutch

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	BK	1250	Ground	I	—
B	0.5	D-GN	59	A/C Compressor Clutch Control	I	—

Q12 Evaporative Emission Purge Solenoid Valve



Connector Part Information

Harness Type: Engine

OEM Connector: 12124037

Service Connector: 13585860

Description: 2-Way F 150 Metri-Pack Series, Sealed (BK)

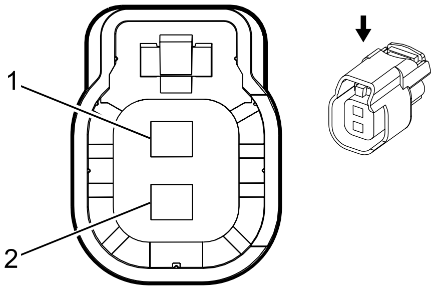
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

Q12 Evaporative Emission Purge Solenoid Valve

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.5	PK	1939	Run/Crank Ignition 1 Voltage	I	—
B	0.5	D-GN/WH	428	EVAP Canister Purge Solenoid Control	I	—

Q13 Evaporative Emission Vent Solenoid Valve



Connector Part Information

Harness Type: Chassis

OEM Connector: 13771883

Service Connector: 13579002

Description: 2-Way F 1.5 Series, Sealed (BK)

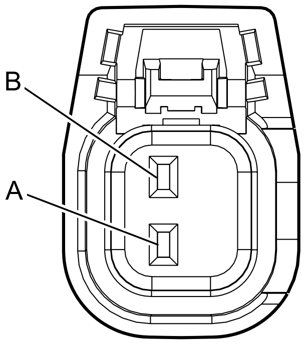
Terminal Part Information

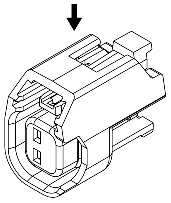
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-2A (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required

Q13 Evaporative Emission Vent Solenoid Valve

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	WH	1310	EVAP Canister Vent Solenoid Control	I	—
2	0.5	RD/WH	40	Battery Positive Voltage	I	—

Q17A Fuel Injector 1





Connector Part Information

Harness Type: Engine

OEM Connector: 15419715

Service Connector: 13580876

Description: 2-Way F 150 GT Series, Sealed (GY)

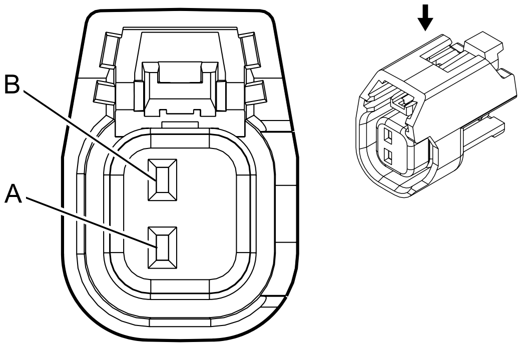
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

Q17A Fuel Injector 1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	PK	1039	Run/Crank Ignition 1 Voltage	I	—
B	0.5	TN	1744	Fuel Injector Control 1	I	—

Q17B Fuel Injector 2



Connector Part Information

Harness Type: Engine

OEM Connector: 15419715

Service Connector: 13580876

Description: 2-Way F 150 GT Series, Sealed (GY)

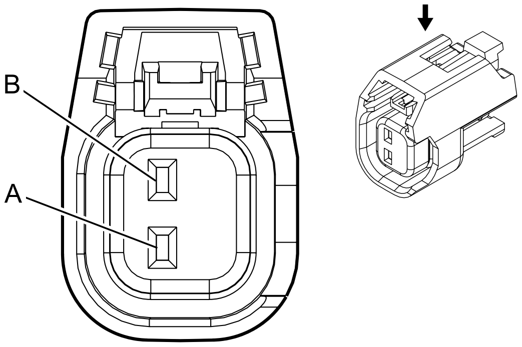
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

Q17B Fuel Injector 2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	PK	1239	Run/Crank Ignition 1 Voltage	I	—
B	0.5	L-GN/BK	1745	Fuel Injector Control 2	I	—

Q17C Fuel Injector 3



Connector Part Information

Harness Type: Engine

OEM Connector: 15419715

Service Connector: 13580876

Description: 2-Way F 150 GT Series, Sealed (GY)

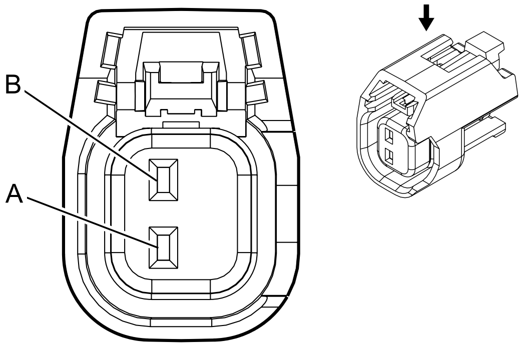
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

Q17C Fuel Injector 3

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	PK	1039	Run/Crank Ignition 1 Voltage	I	—
B	0.5	PK/BK	1746	Fuel Injector Control 3	I	—

Q17D Fuel Injector 4



Connector Part Information

Harness Type: Engine

OEM Connector: 15419715

Service Connector: 13580876

Description: 2-Way F 150 GT Series, Sealed (GY)

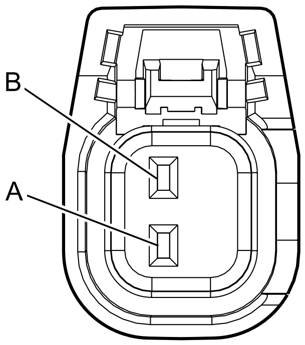
Terminal Part Information

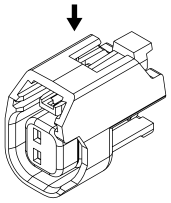
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

Q17D Fuel Injector 4

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	PK	1239	Run/Crank Ignition 1 Voltage	I	—
B	0.5	L-BU/BK	844	Fuel Injector Control 4	I	—

Q17E Fuel Injector 5





Connector Part Information

Harness Type: Engine

OEM Connector: 15419715

Service Connector: 13580876

Description: 2-Way F 150 GT Series, Sealed (GY)

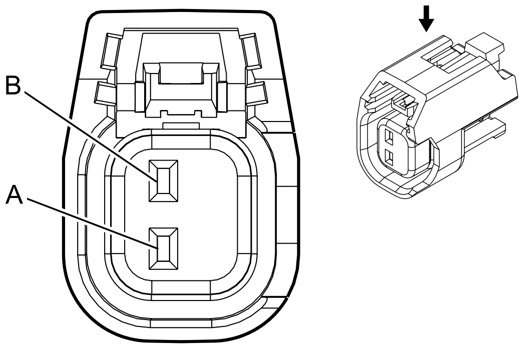
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

Q17E Fuel Injector 5

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	PK	1039	Run/Crank Ignition 1 Voltage	I	—
B	0.5	TN/WH	845	Fuel Injector Control 5	I	—

Q17F Fuel Injector 6



Connector Part Information

Harness Type: Engine

OEM Connector: 15419715

Service Connector: 13580876

Description: 2-Way F 150 GT Series, Sealed (GY)

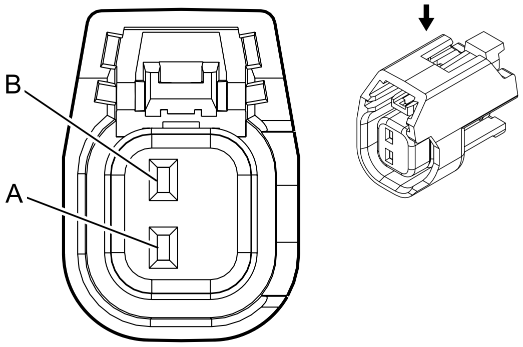
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

Q17F Fuel Injector 6

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	PK	1239	Run/Crank Ignition 1 Voltage	I	—
B	0.5	YE/BK	846	Fuel Injector Control 6	I	—

Q17G Fuel Injector 7



Connector Part Information

Harness Type: Engine

OEM Connector: 15419715

Service Connector: 13580876

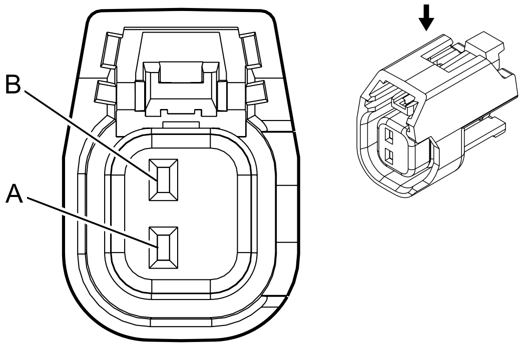
Description: 2-Way F 150 GT Series, Sealed (GY)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

Q17G Fuel Injector 7

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	PK	1039	Run/Crank Ignition 1 Voltage	I	—
B	0.5	OG/BK	877	Fuel Injector Control 7	I	—



Connector Part Information

Harness Type: Engine

OEM Connector: 15419715

Service Connector: 13580876

Description: 2-Way F 150 GT Series, Sealed (GY)

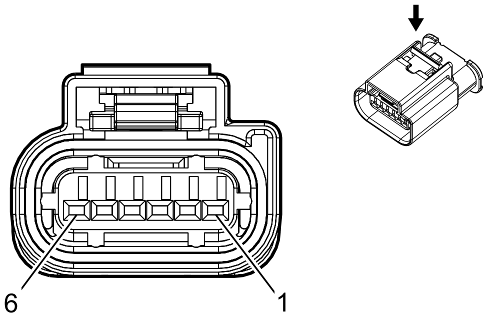
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

Q17H Fuel Injector 8

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	PK	1239	Run/Crank Ignition 1 Voltage	I	—
B	0.5	D-BU/WH	878	Fuel Injector Control 8	I	—

Q38 Throttle Body



Connector Part Information

Harness Type: Engine

OEM Connector: 33220833

Service Connector: 19352911

Description: 6-Way F 1.2 MCON Series, Sealed (BK)

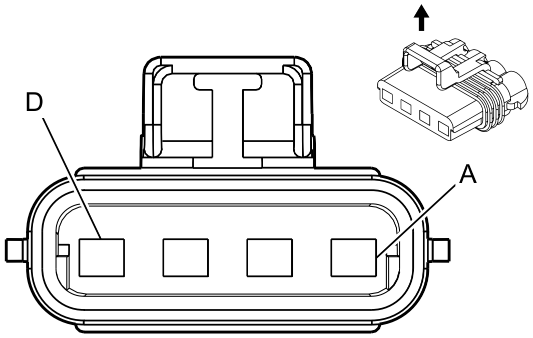
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-16 (LT GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

Q38 Throttle Body

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	YE	581	Throttle Actuator Control Open	I	—
2	0.5	BN	582	Throttle Actuator Control Close	I	—
3	0.5	D-GN	485	Throttle Position Sensor Signal 1	I	—
4	0.5	TN	2752	Throttle Position Sensor Low Reference	I	—
5	0.5	GY	2701	Throttle Position Sensor 5V Reference	I	—
6	—	—	—	Not Occupied	—	—

R3B Blower Motor Resistor - Auxiliary



Connector Part Information

Harness Type: Auxiliary HVAC

OEM Connector: 12129566

Service Connector: Service by Harness - See Part Catalog

Description: 4-Way F 280 Metri-Pack Series, Sealed (GY)

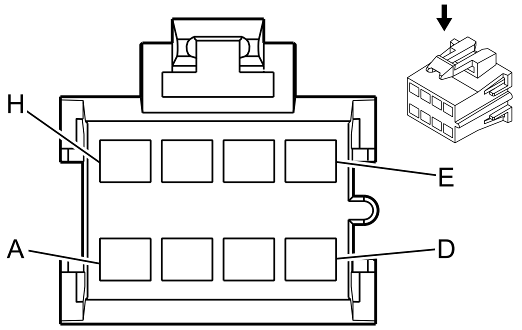
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

R3B Blower Motor Resistor - Auxiliary

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	3	YE	1176	Auxiliary Blower Motor Low Speed Control	I	—
B	—	—	—	Not Occupied	—	—
C	3	L-BU	1072	Auxiliary Blower Motor Medium Speed Control	I	—
D	3	YE	1172	Auxiliary Blower Motor Control	I	—

S13A Door Lock Switch - Rear Cargo



Connector Part Information

Harness Type: Right Rear Cargo Door

OEM Connector: 12064998

Service Connector: Service by Harness - See Part Catalog

Description: 8-Way F 280 Metri-Pack Series (BK)

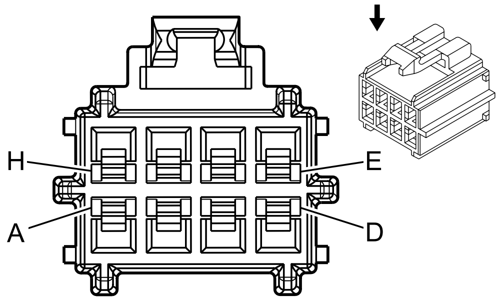
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

S13A Door Lock Switch - Rear Cargo

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.35	L-BU	244	Passenger Door Lock Switch Lock Control	I	—
B - C	—	—	—	Not Occupied	—	—
D	0.35	D-BU	245	Passenger Door Lock Switch Unlock Control	I	—
E	0.35	BK/WH	1051	Signal Ground	I	—
F - H	—	—	—	Not Occupied	—	—

S13D Door Lock Switch - Driver



Connector Part Information

Harness Type: Driver Door

OEM Connector: 15418533

Service Connector: Service by Harness - See Part Catalog

Description: 8-Way F 280 GT Series (L-GN)

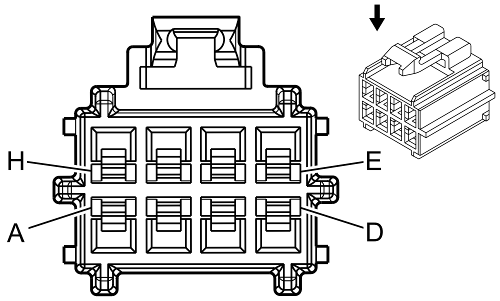
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

S13D Door Lock Switch - Driver

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.35	BK	450	Ground	I	—
B	0.35	BK	450	Ground	I	—
C	0.35	BN/WH	230	Instrument Panel Lamp Dimming Control	I	—
D - E	—	—	—	Not Occupied	—	—
F	0.35	OG/BK	781	Driver Door Lock Switch Unlock Signal	I	—
G	0.35	PK/BK	780	Driver Door Lock Switch Lock Signal	I	—
H	—	—	—	Not Occupied	—	—

S13P Door Lock Switch - Passenger



Connector Part Information

Harness Type: Passenger Door

OEM Connector: 15418533

Service Connector: Service by Harness - See Part Catalog

Description: 8-Way F 280 GT Series (L-GN)

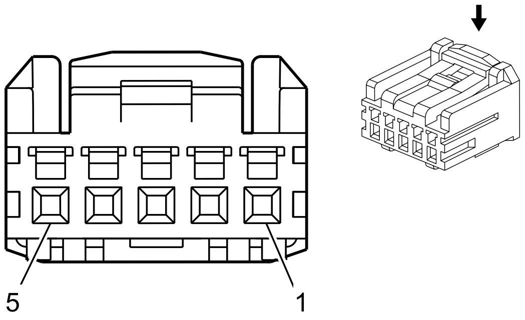
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

S13P Door Lock Switch - Passenger

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.35	BK	1850	Ground	I	—
B	0.35	BK	1850	Ground	I	—
C	0.35	BN/WH	230	Instrument Panel Lamp Dimming Control	I	—
D - E	—	—	—	Not Occupied	—	—
F	0.35	D-BU	245	Passenger Door Lock Switch Unlock Control	I	—
G	0.35	L-BU	244	Passenger Door Lock Switch Lock Control	I	—
H	—	—	—	Not Occupied	—	—

S16 Driver Information Center Switch



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 15491277

Service Connector: 88988747

Description: 5-Way F HCM Series (BK)

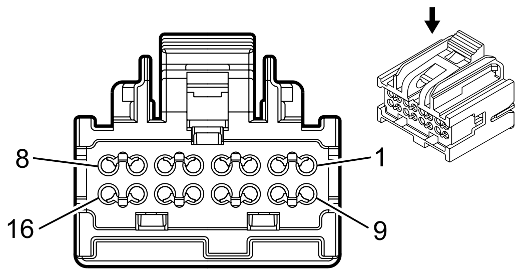
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-64B (LT BU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

S16 Driver Information Center Switch

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.35	D-GN/WH	1358	Driver Information Center Switch Signal	I	—
2	0.35	BN	897	Driver Information Center Switch Low Reference	I	—
3	0.35	PK	893	Driver Information Center Select Menu Switch Signal	I	—
4	0.5	YE	6817	LED Backlight Dimming Control	I	—
5	0.5	BK/WH	351	Signal Ground	I	—

S30 Headlamp Switch



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 13568238

Service Connector: 13504130

Description: 16-Way F 64 Micro-Series, Sealed (BK)

Terminal Part Information

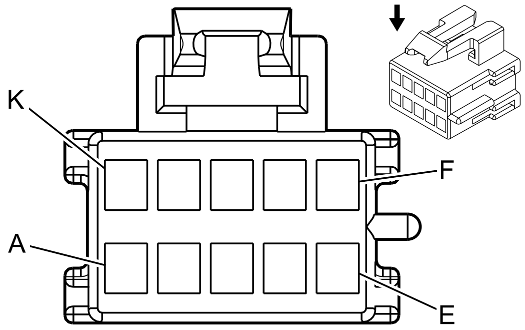
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575535	J-35616-64B (LT BU)	J-38125-21	15359541	Delphi 4	M	M
II	13579976	J-35616-64B (LT BU)	J-38125-21	15359541	Delphi 4	M	M

S30 Headlamp Switch

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.35	WH	103	Headlamp Switch On Signal	I	—
2	0.35	L-BU	13	Headlamp Switch Park Lamp Signal	I	—
3	0.35	D-GN	306	Headlamp Switch Headlamps Off Signal Control	I	—
4 - 6	—	—	—	Not Occupied	—	—
7	0.35	BN/WH	230	Instrument Panel Lamp Dimming Control	I	—
8	0.5	BK/WH	351	Signal Ground	II	—
9	0.35	PU	328	Interior Lamp Defeat Switch Signal	I	—
10 - 11	—	—	—	Not Occupied	—	—

12	0.35	D-BU/WH	149	Courtesy Lamp Control	I	—
13	0.35	D-GN	44	Instrument Panel Lamp Dimmer Switch Signal	I	—
14	—	—	—	Not Occupied	—	—
15	0.35	OG/WH	812	12V Reference	I	—
16	—	—	—	Not Occupied	—	—

S34F HVAC Controls Switch Assembly - Auxiliary Front



Connector Part Information

Harness Type: Headliner

OEM Connector: 12064871

Service Connector: 12101832

Description: 10-Way F 150 Metri-Pack Series (BU)

Terminal Part Information

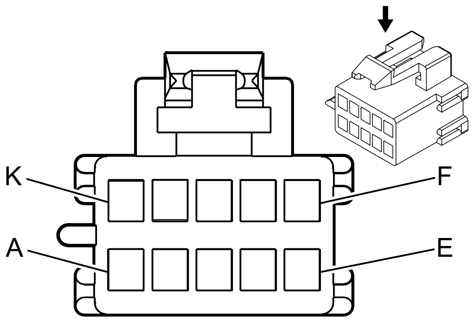
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575464	J-35616-14 (GN)	J-38125-12A	15326030	Delphi 2	E	C

S34F HVAC Controls Switch Assembly - Auxiliary Front

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.35	BN/WH	230	Instrument Panel Lamp Dimming Control	I	—
B	0.35	BK	1850	Ground	I	5BV
	0.5	BK	1850	Ground	I	-5BV
C	0.5	D-BU	1926	Auxiliary Blower Motor Low Speed Control	I	—
D	0.5	WH	1924	Auxiliary Blower Motor High Speed Control	I	—
E	0.5	OG	1925	Auxiliary Blower Motor Medium Speed Control	I	—
F	0.35	PK/BK	5265	Dual Logic Module Rear Control Signal	I	5BV
	0.35	BK	1850	Ground	I	-5BV

G	0.35	BN	341	Run Ignition 3 Voltage	I	—
H	0.35	BN	5263	Dual Logic Module Rear Temperature Signal	I	5BV
	0.35	OG	2775	Rear Air Temperature Motor Control	I	-5BV
J	0.35	PU/WH	5264	Dual Logic Module Rear Mode Signal	I	5BV
	0.35	GY	2599	Rear Mode Motor Signal	I	-5BV
K	—	—	—	Not Occupied	—	—

S34R HVAC Controls Switch Assembly - Auxiliary Rear



Connector Part Information

Harness Type: Headliner

OEM Connector: 12064769

Service Connector: 12101762

Description: 10-Way F 150 Metri-Pack Series (NA)

Terminal Part Information

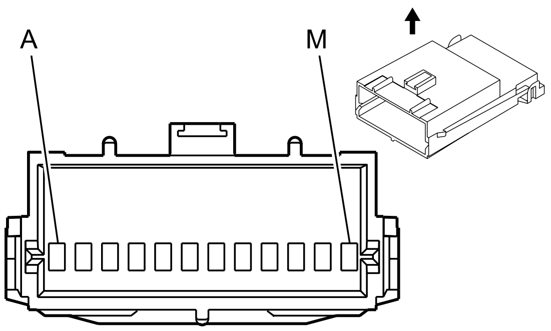
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575464	J-35616-14 (GN)	J-38125-12A	15326030	Delphi 2	E	C

S34R HVAC Controls Switch Assembly - Auxiliary Rear

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.35	BN/WH	230	Instrument Panel Lamp Dimming Control	I	—
B	0.35	BK	1850	Ground	I	—
C	0.5	D-BU	1926	Auxiliary Blower Motor Low Speed Control	I	—
D	0.5	WH	1924	Auxiliary Blower Motor High Speed Control	I	—
E	0.5	OG	1925	Auxiliary Blower Motor Medium Speed Control	I	—
F	0.35	YE	5262	Dual Logic Module Rear Control Enable Signal	I	—
G	0.35	BN	341	Run Ignition 3 Voltage	I	—
H	0.35	PU	5260	Dual Logic Module Front Temperature Signal	I	—

J	0.35	TN	5261	Dual Logic Module Front Mode Signal	I	—
K	—	—	—	Not Occupied	—	—

S34 HVAC Controls Switch Assembly (C69+5BV/3406)



Connector Part Information

Harness Type: Headliner

OEM Connector: 12040747

Service Connector: 12101938

Description: 12-Way P/C Edgeboard Standard Series (BK)

Terminal Part Information

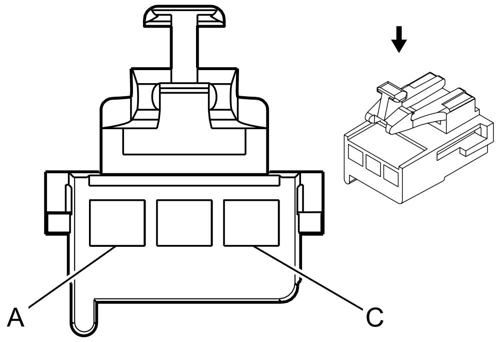
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	19330178	J-35616-4A (PU)	J-38125-12A	12040511	Delphi 3	E	A

S34 HVAC Controls Switch Assembly (C69+5BV/3406)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.35	PU	5260	Dual Logic Module Front Temperature Signal	I	—
B	0.35	OG	2775	Rear Air Temperature Motor Control	I	—
C	0.35	BN	5263	Dual Logic Module Rear Temperature Signal	I	—
	0.5	BN	5263	Dual Logic Module Rear Temperature Signal	I	—
D	0.35	PU/WH	5264	Dual Logic Module Rear Mode Signal	I	—
	0.5	PU/WH	5264	Dual Logic Module Rear Mode Signal	I	—
E	0.35	TN	5261	Dual Logic Module Front Mode Signal	I	—
F	0.35	GY	2599	Rear Mode Motor Signal	I	—
G	—	—	—	Not Occupied	—	—

G	—	—	—	Not Occupied	—	—
H	0.35	BK	1850	Ground	I	—
J	0.35	BN	341	Run Ignition 3 Voltage	I	—
K	—	—	—	Not Occupied	—	—
L	0.35	PK/BK	5265	Dual Logic Module Rear Control Signal	I	—
	0.5	PK/BK	5265	Dual Logic Module Rear Control Signal	I	—
M	0.35	YE	5262	Dual Logic Module Rear Control Enable Signal	I	—

S34 HVAC Controls Switch Assembly X1 (C60/C42/C49)



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 12129489

Service Connector: 12126486

Description: 3-Way F 280 Metri-Pack Flexlock Series (BK)

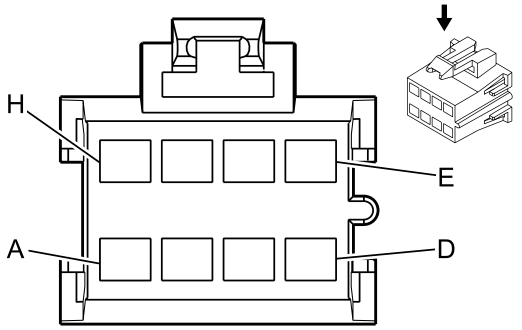
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

S34 HVAC Controls Switch Assembly X1 (C60/C42/C49)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	1	WH	119	Mode Door Control	I	—
B	1	BK	550	Ground	I	—
C	0.35	BN/WH	230	Instrument Panel Lamp Dimming Control	I	—

S34 HVAC Controls Switch Assembly X2 (C60/C42/C49)



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 12064998

Service Connector: 15306189

Description: 8-Way F 280 Metri-Pack Series (BK)

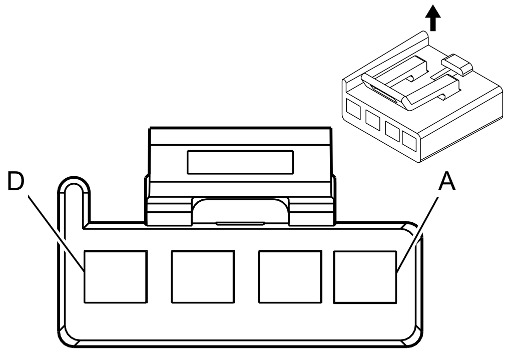
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

S34 HVAC Controls Switch Assembly X2 (C60/C42/C49)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	YE	60	Low Blower Motor Control	I	—
B	0.8	TN	63	Medium Blower Motor Control 1	I	—
C	0.8	L-BU	72	Medium 2 Blower Motor Control	I	—
D	0.8	OG	52	High Blower Motor Control	I	—
E	1	BN	141	Run Ignition 3 Voltage	I	—
F	0.8	L-BU	733	Air Temperature Door Position Signal	I	—
G	1	WH	119	Mode Door Control	I	—
H	0.5	D-GN/WH	762	A/C Request Signal	I	—

S34 HVAC Controls Switch Assembly X3 (C60/C42/C49)



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 12052856

Service Connector: 12125636

Description: 4-Way F 280 Metri-Pack Series (BK)

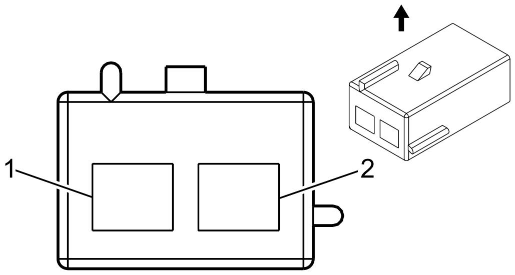
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

S34 HVAC Controls Switch Assembly X3 (C60/C42/C49)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	RD/WH	4440	Battery Positive Voltage	I	—
B	0.35	BN	341	Run Ignition 3 Voltage	I	—
C	1	BK	550	Ground	I	—
D	0.35	WH	193	Rear Defog Relay Control	I	—

S34 HVAC Controls Switch Assembly X4 (C60/C42/C49)



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 15318080

Service Connector: 21019410

Description: 2-Way F 280 Metri-Pack Series (BK)

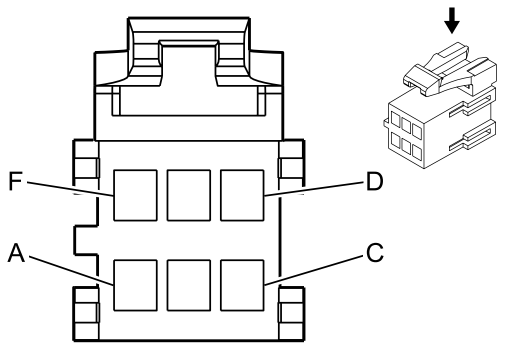
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

S34 HVAC Controls Switch Assembly X4 (C60/C42/C49)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	L-GN	66	A/C Request Signal	I	—
2	0.5	D-GN/WH	762	A/C Request Signal	I	—

S40 Passenger Air Bag Disable Switch



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 15305286

Service Connector: 15306014

Description: 6-Way F 150 Metri-Pack Series (YE)

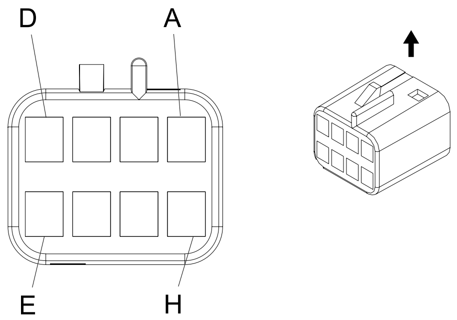
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

S40 Passenger Air Bag Disable Switch

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.5	TN/BK	371	Passenger IP Module Disable Switch Signal	I	—
B	0.35	PK	1139	Run/Crank Ignition 1 Voltage	I	—
C	0.35	D-BU	2307	Passenger Air Bag On Indicator Control	I	—
D	0.5	PK	353	Passenger IP Module Suppression Indicator Control	I	—
E	0.5	BK/WH	1751	Signal Ground	I	—
F	0.35	D-GN	2308	Passenger Air Bag Off Indicator Control	I	—

S51 Telematics Button Assembly



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 12047886

Service Connector: 13584485

Description: 8-Way F 150 Metri-Pack Series (BK)

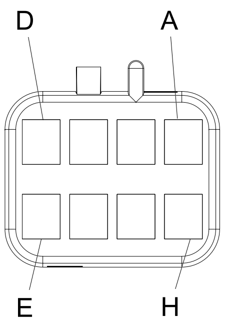
Terminal Part Information

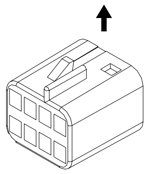
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

S51 Telematics Button Assembly

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	L-GN/BK	2515	Keypad Control	I	—
B	0.8	D-GN/WH	2514	Keypad Signal	I	—
C - D	—	—	—	Not Occupied	—	—
E	1	BK/WH	351	Signal Ground	I	—
F	0.8	YE/BK	2516	Keypad Green LED Control	I	—
G	0.8	BN/WH	2517	Keypad Red LED Control	I	—
H	—	—	—	Not Occupied	—	—

S52 Outside Rearview Mirror Switch





Connector Part Information

Harness Type: Driver Door

OEM Connector: 12047886

Service Connector: Service by Harness - See Part Catalog

Description: 8-Way F 150 Metri-Pack Series (BK)

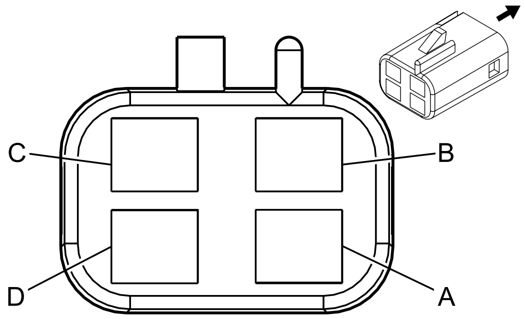
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

S52 Outside Rearview Mirror Switch

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.35	OG/WH	881	Right Mirror Motor Right Control	I	—
B	0.35	PU/WH	889	Right Mirror Motor Down Control	I	—
C	0.35	BN/WH	1498	Right Mirror Motor Up Control	I	—
D	0.5	BK	450	Ground	I	—
E	0.5	RD/WH	4340	Battery Positive Voltage	I	—
F	0.35	L-GN	89	Left Mirror Motor Down Control	I	—
G	0.35	WH	81	Left Mirror Motor Right Control	I	—
H	0.35	YE	88	Left Mirror Motor Up Control	I	—

S74 Tow/Haul Mode Switch



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 12047785

Service Connector: 12102900

Description: 4-Way F 150 Metri-Pack Series (BK)

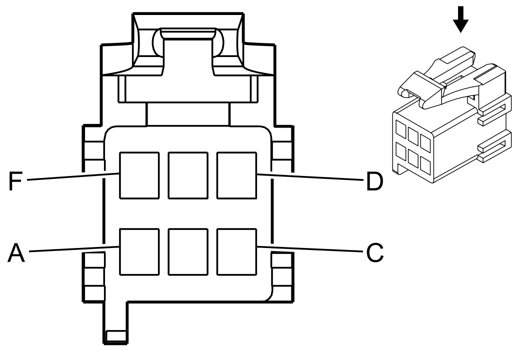
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

S74 Tow/Haul Mode Switch

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.5	BK/WH	351	Signal Ground	I	—
B	0.35	BN/WH	230	Instrument Panel Lamp Dimming Control	I	—
C	—	—	—	Not Occupied	—	—
D	0.35	L-BU	1788	Traction Control Switch Signal 1	I	—

S75 Traction Control Switch



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 12177195

Service Connector: 15305931

Description: 6-Way F 150 Metri-Pack Series (BK)

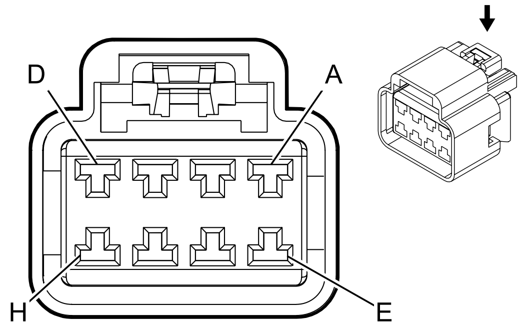
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

S75 Traction Control Switch

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A - B	—	—	—	Not Occupied	—	—
C	0.35	BK/WH	351	Signal Ground	I	—
D	0.35	BN/WH	230	Instrument Panel Lamp Dimming Control	I	—
E	—	—	—	Not Occupied	—	—
F	0.5	D-BU	6727	Vehicle Stability Control Off Switch Signal	I	—

S79D Window Switch - Driver



Connector Part Information

Harness Type: Driver Door

OEM Connector: 15459914

Service Connector: Service by Harness - See Part Catalog

Description: 8-Way F 280 GT Series (BK)

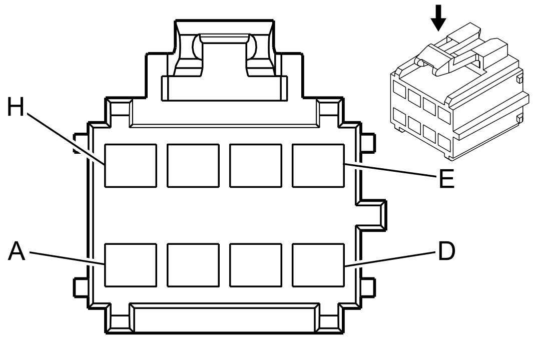
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

S79D Window Switch - Driver

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	3	L-BU	166	Power Window Master Switch Right Front Up Signal	I	—
B	0.35	BN/WH	230	Instrument Panel Lamp Dimming Control	I	—
C	3	D-GN	1001	Retained Accessory Power Ignition	I	—
D	3	TN	167	Power Window Master Switch Right Front Down Signal	I	—
E	—	—	—	Not Occupied	—	—
F	3	BK	450	Ground	I	—
G	3	D-BU	164	Power Window Motor Left Front Up Control	I	—
H	3	BN	165	Power Window Motor Left Front Down Control	I	—

S79P Window Switch - Passenger



Connector Part Information

Harness Type: Passenger Door

OEM Connector: 12191825

Service Connector: Service by Harness - See Part Catalog

Description: 8-Way F 280 Metri-Pack Series (BN)

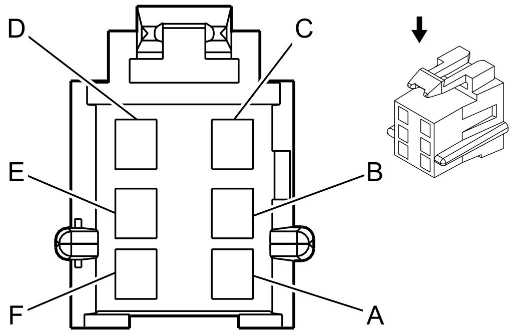
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

S79P Window Switch - Passenger

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	3	D-GN	1001	Retained Accessory Power Ignition	I	—
B	0.35	BN/WH	230	Instrument Panel Lamp Dimming Control	I	—
C	0.35	BK	1850	Ground	I	—
D	3	TN	167	Power Window Master Switch Right Front Down Signal	I	—
E	—	—	—	Not Occupied	—	—
F	3	BN	667	Power Window Motor Right Front Down Control	I	—
G	3	D-BU	666	Power Window Motor Right Front Up Control	I	—
H	3	L-BU	166	Power Window Master Switch Right Front Up Signal	I	—

S85 Auxiliary Blower Motor Switch



Connector Part Information

Harness Type: Auxiliary Heater - Front Jumper

OEM Connector: 12064752

Service Connector: Service by Harness - See Part Catalog

Description: 6-Way F 280 Metri-Pack Series (BK)

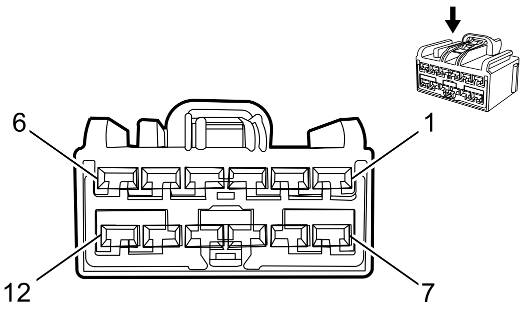
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

S85 Auxiliary Blower Motor Switch

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.35	BN/WH	230	Instrument Panel Lamp Dimming Control	I	—
B	0.35	BK	450	Ground	I	—
C	—	—	—	Not Occupied	—	—
D	0.35	WH	1924	Auxiliary Blower Motor High Speed Control	I	—
E	0.35	D-BU	1926	Auxiliary Blower Motor Low Speed Control	I	—
F	0.35	OG	1925	Auxiliary Blower Motor Medium Speed Control	I	—

T1 Accessory DC/AC Power Inverter Module



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 10846814

Service Connector: 13580444

Description: 12-Way F 2.8 Kaizen Series (L-GY)

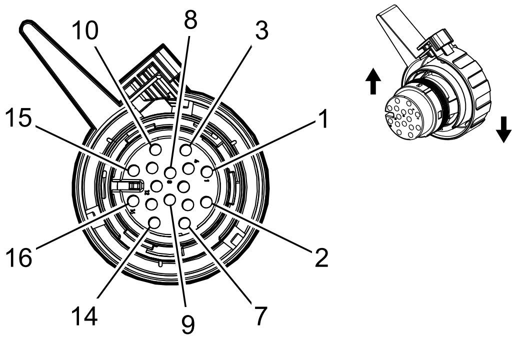
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	19301761	J-35616-35 (VT)	J-38125-11A	Not Available	Not Available	Not Available	Not Available

T1 Accessory DC/AC Power Inverter Module

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	—	—	—	Not Occupied	—	—
2	1	BK	5683	120 V AC Phase A	I	—
3 - 5	—	—	—	Not Occupied	—	—
6	3	RD/WH	4140	Battery Positive Voltage	I	—
7	1	WH	5685	120 V AC Neutral	I	—
8 - 9	—	—	—	Not Occupied	—	—
10	0.5	BK/WH	1351	Signal Ground	I	—
11	3	BK	550	Ground	I	—
12	0.35	D-GN	2266	DC To AC Inverter Control 2	I	—

T12 Automatic Transmission Assembly



Connector Part Information

Harness Type: Engine

OEM Connector: 13878751

Service Connector: 19303772

Description: 16-Way F 1.5 Series, Sealed (BK)

Terminal Part Information

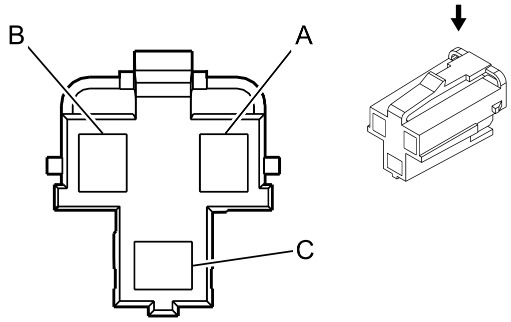
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575434	J-35616-66 (YE)	J-38125-28	2 21 24 47220 0	Yazaki 12	E	1
II	13578934	J-35616-66 (YE)	J-38125-28	2 21 24 47220 0	Yazaki 12	E	1

T12 Automatic Transmission Assembly

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1 - 2	—	—	—	Not Occupied	—	—
3	0.5	OG/BK	1786	Transmission Park/Neutral Signal 1	I	—
4	0.35	RD/WH	1840	Battery Positive Voltage	I	—
5	0.8	BK/WH	1551	Signal Ground	II	—
6	0.5	L-BU/WH	6311	Cruise/ETC/TCC Brake Signal	II	—
7	—	—	—	Not Occupied	—	—
8	0.5	TN	2501	High Speed GMLAN Serial Data (-) 1	II	—
9	0.5	D-BU	5985	Accessory Wakeup Serial Data	II	—

10	0.5	TN/BK	2500	High Speed GMLAN Serial Data (+) 1	II	—
11	0.5	TN	2501	High Speed GMLAN Serial Data (-) 1	II	—
12	0.5	PK	2139	Run/Crank Ignition 1 Voltage	II	—
13	0.5	TN	2501	High Speed GMLAN Serial Data (-) 1	II	—
14	0.5	TN/BK	2500	High Speed GMLAN Serial Data (+) 1	II	—
15	0.5	TN/BK	2500	High Speed GMLAN Serial Data (+) 1	II	—
16	0.5	OG/BK	6399	Replicated TOS Signal	II	—

X80B Accessory Power Receptacle - Center Console 2



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 12176836

Service Connector: 19257374

Description: 3-Way F 280 Metri-Pack Series (GY)

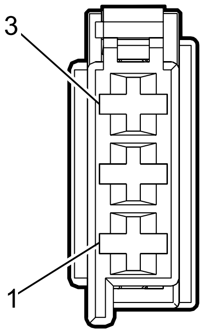
Terminal Part Information

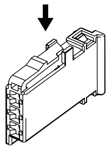
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

X80B Accessory Power Receptacle - Center Console 2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	1	RD/WH	1040	Battery Positive Voltage	I	—
B	—	—	—	Not Occupied	—	—
C	1	BK	550	Ground	I	—

X81 Accessory Power Receptacle - 110V AC X1





Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 10865339

Service Connector: 93186706

Description: 3-Way F 1.6 Micro-Timer Series (BK)

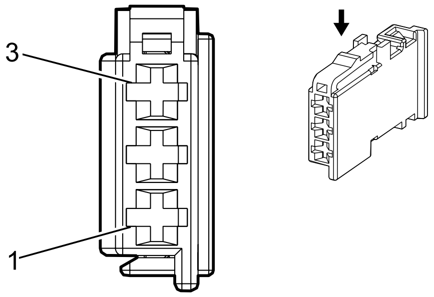
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

X81 Accessory Power Receptacle - 110V AC X1

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.5	D-BU	6807	DC To AC Inverter Control	I	—
2	—	—	—	Not Occupied	—	—
3	1	BK	5683	120 V AC Phase A	I	—

X81 Accessory Power Receptacle - 110V AC X2



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 13648774

Service Connector: 13583924

Description: 3-Way F 1.6 Timer Series, Sealed (GY)

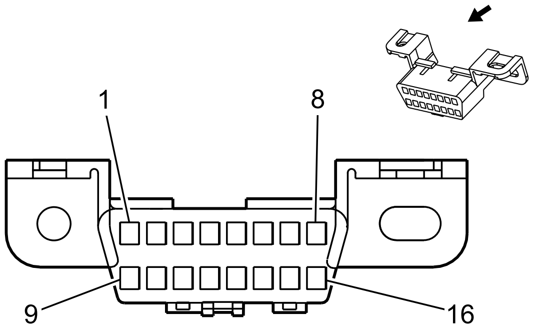
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required

X81 Accessory Power Receptacle - 110V AC X2

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.35	D-GN	2266	DC To AC Inverter Control 2	I	—
2	—	—	—	Not Occupied	—	—
3	1	WH	5685	120 V AC Neutral	I	—

X84 Data Link Connector



Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 12110250

Service Connector: 12110250

Description: 16-Way F 150 Metri-Pack Series (BK)

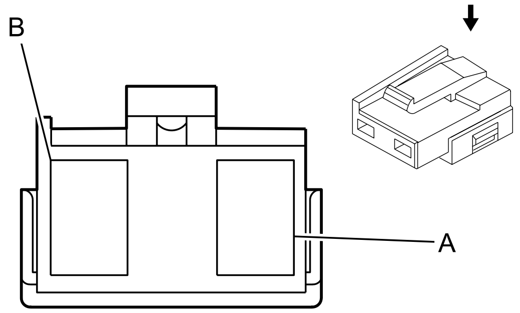
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575724	J-35616-14 (GN)	J-38125-12A	12129484	Delphi 19	E	C
II	13575725	J-35616-14 (GN)	J-38125-12A	12129484	Delphi 19	E	A

X84 Data Link Connector

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.35	D-GN	5060	Low Speed GMLAN Serial Data	I	—
2 - 3	—	—	—	Not Occupied	—	—
4	0.5	BK/WH	351	Signal Ground	I	—
5	0.5	BK/WH	351	Signal Ground	I	—
6	0.5	TN/BK	2500	High Speed GMLAN Serial Data (+) 1	I	—
7 - 13	—	—	—	Not Occupied	—	—
14	0.5	TN	2501	High Speed GMLAN Serial Data (-) 1	I	—
15	—	—	—	Not Occupied	—	—
16	0.8	RD/WH	640	Battery Positive Voltage	II	—

X87RB Sliding Door Jamb Contact Plate - Right Body



Connector Part Information

Harness Type: Body

OEM Connector: 12034343

Service Connector: 12101821

Description: 2-Way F 280 Metri-Pack Series (BK)

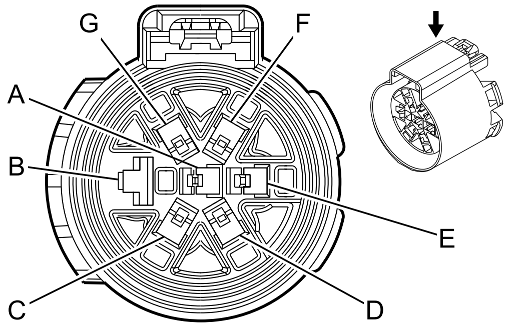
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

X87RB Sliding Door Jamb Contact Plate - Right Body

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	0.8	TN	294	Door Lock Actuator Unlock Control	I	—
B	1	GY	295	Door Lock Actuator Lock Control	I	AU3
	0.8	GY	295	Door Lock Actuator Lock Control	I	AU3+E26

X88 Trailer Connector (JL4)



Connector Part Information

Harness Type: Chassis

OEM Connector: 13857223

Service Connector: 13583927

Description: 7-Way F 280, 630 Metri-Pack Series, Sealed (BK)

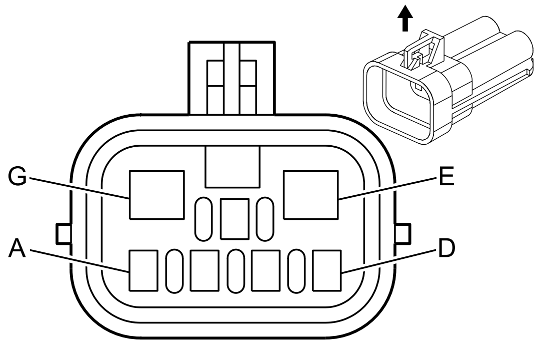
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-42 (RD)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

X88 Trailer Connector (JL4)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	1	L-GN	1624	Trailer Backup Lamp Control	II	—
B	8	WH	22	Trailer Ground	I	—
C	3	D-BU	47	Trailer Auxiliary Control	II	—
D	1	D-GN	1619	Right Rear Trailer Stop/Turn Lamp Control	II	—
E	3	RD/BK	742	Battery Positive Voltage	II	—
F	1	BN	2109	Trailer Park Lamp Control	II	—
G	1	YE	1618	Left Rear Trailer Stop/Turn Lamp Control	II	—

X88 Trailer Connector (-JL4)



Connector Part Information

Harness Type: Chassis

OEM Connector: 12052200

Service Connector: 19299890

Description: 7-Way M 150, 480 Metri-Pack Series, Sealed (BK)

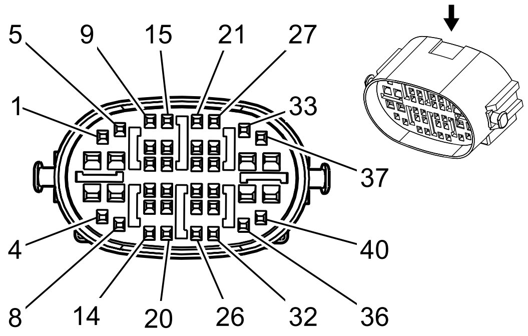
Terminal Part Information

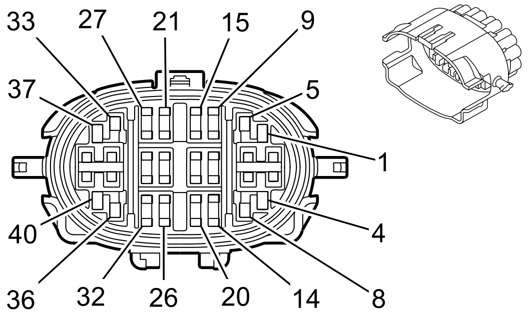
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-3 (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-41 (BU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

X88 Trailer Connector (-JL4)

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
A	1	L-GN	1624	Trailer Backup Lamp Control	I	—
B	1	BN	2109	Trailer Park Lamp Control	I	—
C	1	YE	1618	Left Rear Trailer Stop/Turn Lamp Control	I	—
D	—	—	—	Not Occupied	—	—
E	3	D-BU	47	Trailer Auxiliary Control	II	—
F	1	D-GN	1619	Right Rear Trailer Stop/Turn Lamp Control	I	—
G	3	RD/BK	742	Battery Positive Voltage	II	—

X100 Instrument Panel Harness to Engine Harness (-LWN)





Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 13601803

Service Connector: 19166997

Description: 40-Way F 150, 280 GT Series, Sealed (BK)

Connector Part Information

Harness Type: Engine

OEM Connector: 13605375

Service Connector: 19169297

Description: 40-Way M 150, 280 GT Series, Sealed (BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575396	J-35616-14 (GN)	J-38125-553	15326427	Delphi 5	E	A
II	13575412	J-35616-14 (GN)	J-38125-553	12191819	Delphi 8	E	1
III	13575412	J-35616-14 (GN)	J-38125-553	Not Available	Not Available	Not Available	Not Available
IV	13576356	J-35616-4A (PU)	J-38125-553	15304719	Delphi 19	2	5
V	13576356	J-35616-4A (PU)	J-38125-553	15304719	Delphi 19	E	5
VI	13576407	J-35616-4A (PU)	J-38125-553	15304720	Delphi 19	4	5
VII	13575397	J-35616-3 (GY)	J-38125-553	15326269	Delphi 19	E	4
VIII	13575443	J-35616-5 (PU)	J-38125-553	15304732	Delphi 8	A	5
IX	13576364	J-35616-3 (GY)	J-38125-553	Not Available	Not Available	Not Available	Not Available
X	13580826	J-35616-5 (PU)	J-38125-553	Not Available	Not Available	Not Available	Not Available

X	[illegible]	[illegible]	[illegible]	Not Available	Not Available	Not Available	Not Available
XI	13588381	J-35616-3 (GY)	J-38125-553	15373403	Delphi 5	E	4

X100 Instrument Panel Harness to Engine Harness (-LWN)

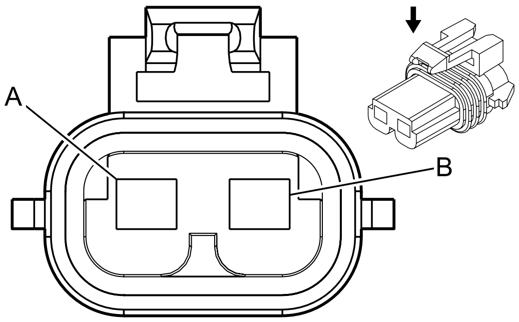
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
1	0.35	WH/D-BU	6311	II	—	Cruise/ETC/TCC Brake Signal	1	0.5	L-BU/WH	6311	VII	—
2	0.8	OG	52	IV	—	High Blower Motor Control	2	0.8	OG	52	X	—
3	0.8	L-BU	72	IV	—	Medium 2 Blower Motor Control	3	2	L-BU	72	VIII	—
4	0.8	OG	1732	II	—	Electronic Control Unit 12V Reference 3	4	0.5	OG	1732	VII	—
5	0.8	BN	141	III	—	Run Ignition 3 Voltage	5	—	—	—	—	—
6	0.8	TN	63	IV	—	Medium Blower Motor Control 1	6	0.8	TN	63	X	—
7	2	BK	1250	VI	—	Ground	7	2	BK	1250	VIII	—
8	0.8	YE	60	III	—	Low Blower Motor Control	8	0.8	YE	60	IX	—
9 - 10	—	—	—	—	—	Not Occupied	9 - 10	—	—	—	—	—
11	0.8	L-GN	2032	III	—	Coolant Temperature Sensor Signal	11	0.8	L-GN	2032	IX	—
		L-GN	1478	II	—	Coolant Level Switch			—	—	—	—

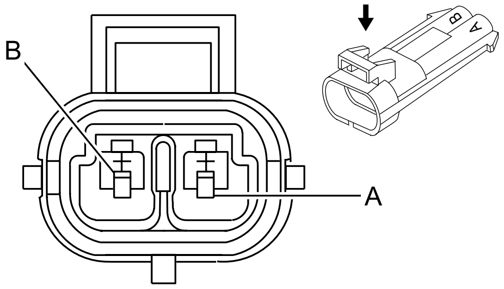
12	0.5	L-GN	1478	II	—	Coolant Level Switch Signal	12	—	—	—	—	—
13	0.5	BK/WH	351	II	—	Signal Ground	13	—	—	—	—	—
14	0.5	L-GN	66	II	—	A/C Request Signal	14	0.5	L-GN	66	VII	—
15	0.5	L-BU	5986	II	—	Serial Data Communication Enable	15	0.5	L-BU	5986	VII	—
16	0.5	L-GN	66	II	—	A/C Request Signal	16	0.5	L-GN/WH	66	VII	—
17	0.5	PU	333	II	—	Brake Fluid Level Sensor Signal	17	0.5	PU	333	VII	—
18	0.5	BN/WH	419	II	—	Check Engine Indicator Control	18	0.5	BN/WH	419	VII	—
19	0.5	D-BU	5985	II	—	Accessory Wakeup Serial Data	19	0.5	D-BU	5985	VII	—
20	0.8	L-BU/BK	6813	III	—	Coolant Temperature Sensor 2 Low Reference	20	0.8	L-BU/BK	6813	IX	—
21	0.35	BK/D-BU	1271	I	—	Accelerator Pedal Position Low Reference 1	21	0.5	BN	1271	XI	—
22	0.35	WH/RD	1164	I	—	Accelerator Pedal Position 5V Reference 1	22	0.5	WH/BK	1164	XI	—
		BN/RD	1274	I	—	Accelerator Pedal			TN	1274	XI	—

23	0.35	BN/RD	1274	I	—	Accelerator Pedal Position 5V Reference 2	23	0.5	TN	1274	XI	—
24	0.5	BK/WH	451	II	—	Signal Ground	24	0.8	BK/WH	451	IX	—
25	0.5	WH	5075	II	—	Current Sensor Signal	25	0.5	WH	5075	VII	—
26	0.5	BN	5077	II	—	Current Sensor Low Reference	26	0.5	BN	5077	VII	—
27	0.35	YE/WH	1161	I	—	Accelerator Pedal Position Signal 1	27	0.5	D-BU	1161	XI	—
28	0.35	BK/VT	1272	I	—	Accelerator Pedal Position Low Reference 2	28	0.5	PU	1272	XI	—
29	0.35	L-GN/WH	1162	I	—	Accelerator Pedal Position Signal 2	29	0.5	L-BU	1162	XI	—
30	0.5	PK	5076	II	—	Current Sensor Control	30	0.5	PK	5076	VII	—
31 - 32	—	—	—	—	—	Not Occupied	31 - 32	—	—	—	—	—
33	—	—	—	—	—	High Speed GMLAN Serial Data (+) 1	33	0.5	TN/BK	2500	VII	—
34	0.5	BK/YE	407	V	—	Sensor Low Reference	34	—	—	—	—	—
35	0.5	L-GN/BK	735	V	—	Outside Ambient Air Temperature Sensor Signal	35	—	—	—	—	—

36	0.5	D-BU	2500	II	—	High Speed GMLAN Serial Data (+) 1	36	0.5	TN/BK	2500	VII	—
37	—	—	—	—	—	High Speed GMLAN Serial Data (-) 1	37	0.5	TN	2501	VII	—
38 - 39	—	—	—	—	—	Not Occupied	38 - 39	—	—	—	—	—
40	0.5	WH	2501	II	—	High Speed GMLAN Serial Data (-) 1	40	0.5	TN	2501	VII	—

X104 Instrument Panel Harness to Inflatable Restraint Harness





Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 12077900

Service Connector: 12116247

Description: 2-Way F 280 Metri-Pack Series, Sealed (BK)

Connector Part Information

Harness Type: Inflatable Restraint

OEM Connector: 15317807

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way M 280 Metri-Pack Series (BK)

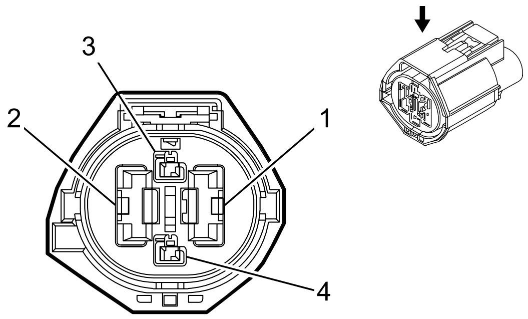
Terminal Part Information

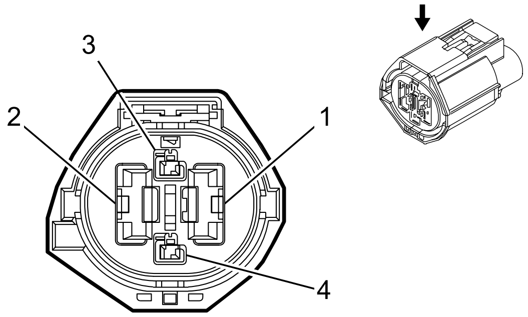
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-5 (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

X104 Instrument Panel Harness to Inflatable Restraint Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	0.5	D-BU/WH	6619	I	—	Middle Front Discriminating Sensor Low Reference	A	0.5	D-BU/WH	6619	II	—
B	0.5	BN/WH	6618	I	—	Middle Front Discriminating Sensor Signal	B	0.5	BN/WH	6618	II	—

X108 Battery Cable Harness to Engine Harness (LWN)





Connector Part Information

Harness Type: Battery Cable

OEM Connector: 13672582

Service Connector: Service by Harness - See Part Catalog

Description: 4-Way F 1.5, 9.5 Series, Sealed (BN)

Connector Part Information

Harness Type: Engine

OEM Connector: —

Service Connector: Service by Harness - See Part Catalog

Description: 4-Way M

Terminal Part Information

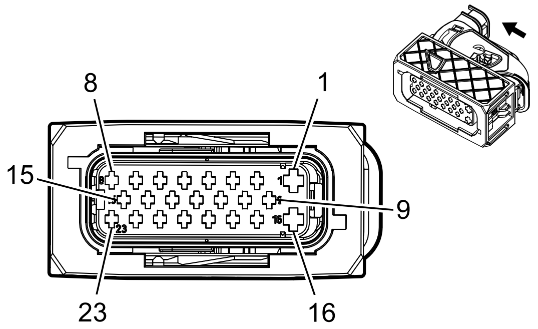
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-42 (RD)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	Not Available	No Tool Required	Not Required	Not Required	Not Required	Not Required

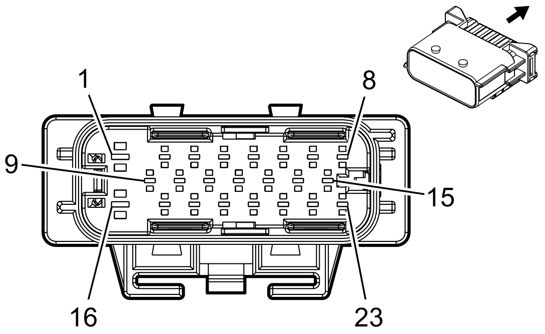
X108 Battery Cable Harness to Engine Harness (LWN)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
1	10	RD	2	I	—	Battery Positive Voltage	1	10	RD	2	II	—
2	10	RD	2	I	—	Battery Positive Voltage	2	10	RD	2	II	—

3 - 4	—	—	—	—	—	Not Occupied	3 - 4	—	—	—	—	—

X115 Engine Harness to Chassis Harness (-LWN)





Connector Part Information

Harness Type: Engine

OEM Connector: 13674800

Service Connector: 19300480

Description: 23-Way F 1.5 DSQ, 2.8 AST Series, Sealed (BK)

Connector Part Information

Harness Type: Chassis

OEM Connector: 13674783

Service Connector: 19303858

Description: 23-Way M 1.5 DSQ, 2.8 AST Series, Sealed (BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13576369	J-35616-14 (GN)	J-38125-560	Not Available	Not Available	Not Available	Not Available
II	13578874	J-35616-14 (GN)	J-38125-560	964274-2	Lear 16	E	1
III	13580830	J-35616-4A (PU)	J-38125-36	Not Available	Not Available	Not Available	Not Available
IV	13575380	J-35616-3 (GY)	J-38125-560	Not Available	Not Available	Not Available	Not Available
V	13580827	J-35616-5 (PU)	J-38125-36	Not Available	Not Available	Not Available	Not Available

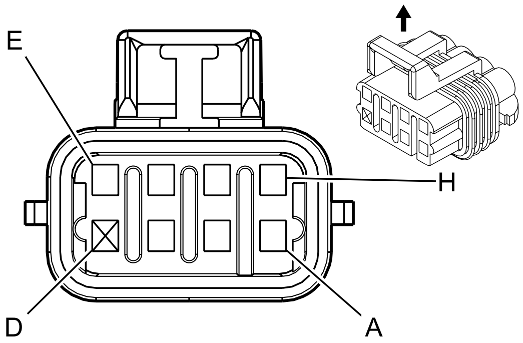
X115 Engine Harness to Chassis Harness (-LWN)

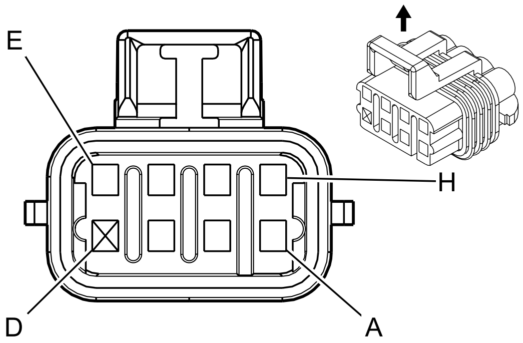
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
1	—	—	—	—	—	Not Occupied	1	—	—	—	—	—
		TN/BK	2500	I	—	High Speed GMLAN			TN/BK	2500	IV	—

2	0.5					Serial Data (+) 1	2	0.5				
3	0.5	TN	2501	I	—	High Speed GMLAN Serial Data (-) 1	3	0.5	TN	2501	IV	—
4	0.5	YE	2375	I	—	Left Rear Corner Object Sensor Signal	4	0.5	YE	2375	IV	—
5	0.5	OG	2376	I	—	Left Rear Middle Object Sensor Signal	5	0.5	OG	2376	IV	—
6	0.5 0.5	D-GN/WH YE/BK	817 1827	I I	JL4 JL9	Vehicle Speed Signal Vehicle Speed Signal	6	0.5 0.5	D-GN/WH YE/BK	817 1827	IV IV	JL4 JL9
7	0.5	GY	2379	I	—	Object Sensor Low Reference	7	0.5	GY	2379	IV	—
8	0.5	D-GN/WH	465	I	—	Fuel Pump Primary Relay Control	8	0.5	D-GN/WH	465	IV	—
9	0.5	PU	1589	I	—	Primary Fuel Level Sensor Signal	9	0.5	PU	1589	IV	—
10	0.5	D-GN	2377	I	—	Right Rear Middle Object Sensor Signal	10	0.5	D-GN	2377	IV	—
11	0.8	WH	1579	II	—	Fuel Temperature/Composition Signal	11	0.8	WH	1579	IV	—
12	0.5	WH	1310	I	—	EVAP Canister Vent Solenoid Control	12	0.5	WH	1310	IV	—

13	0.8	BK/WH	1551	II	—	Signal Ground	13	0.8	BK/WH	1551	IV	—
14	0.5	D-BU	2374	I	—	Object Sensor Control	14	0.5	D-BU	2374	IV	—
15	0.5	PU	2378	I	—	Right Rear Corner Object Sensor Signal	15	0.5	PU	2378	IV	—
16	0.5	D-BU	5985	III	—	Accessory Wakeup Serial Data	16	0.5	D-BU	5985	V	—
17	0.5	TN	2759	I	—	Fuel Tank Pressure Sensor Low Reference	17	0.5	TN	2759	IV	—
18	0.5	GY	2709	I	—	Fuel Tank Pressure Sensor 5V Reference	18	0.5	GY	2709	IV	—
19	—	—	—	—	—	Not Occupied	19	—	—	—	—	—
20	0.5	L-BU	5986	I	—	Serial Data Communication Enable	20	0.5	L-BU	5986	IV	—
21	0.5	D-GN	890	I	—	Fuel Tank Pressure Sensor Signal	21	0.5	D-GN	890	IV	—
22	0.5	TN/BK	2500	I	—	High Speed GMLAN Serial Data (+) 1	22	—	—	—	—	—
23	0.5	TN	2501	I	—	High Speed GMLAN Serial Data (-) 1	23	—	—	—	—	—

X126 Engine Harness to Left Ignition Coil Harness





Connector Part Information

Harness Type: Engine

OEM Connector: 12047938

Service Connector: 13580883

Description: 8-Way F 150 Metri-Pack Series, Sealed (L-GY)

Connector Part Information

Harness Type: Left Ignition Coil

OEM Connector: —

Service Connector: Service by Harness - See Part Catalog

Description: 8-Way M

Terminal Part Information

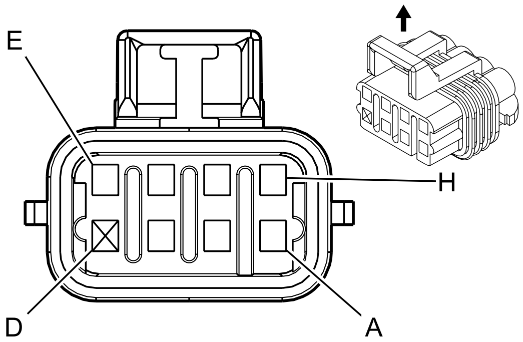
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	Not Available	No Tool Required	Not Required	Not Required	Not Required	Not Required

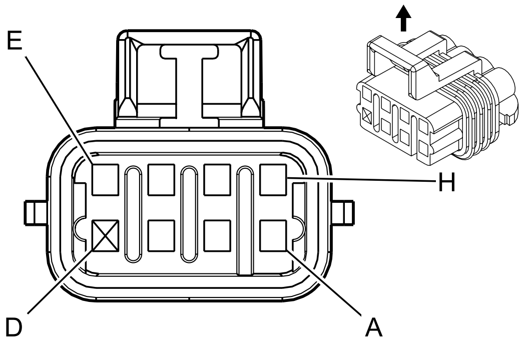
X126 Engine Harness to Left Ignition Coil Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	1	BK	1250	I	—	Ground	A	1	BK	1250	II	—
B	0.8	OG	2127	I	—	Ignition Control 7	B	0.8	OG	2127	II	—

C	0.8	D-GN	2125	I	—	Ignition Control 5	C	0.8	D-GN	2125	II	—
E	0.8	BN	2129	I	—	Ignition Control Low Reference Bank 1	E	0.8	BN	2129	II	—
F	0.8	L-BU	2123	I	—	Ignition Control 3	F	0.8	L-BU	2123	II	—
G	0.8	PU	2121	I	—	Ignition Control 1	G	0.8	PU	2121	II	—
H	1	PK	1039	I	—	Run/Crank Ignition 1 Voltage	H	1	PK	1039	II	—

X127 Engine Harness to Right Ignition Coil Harness





Connector Part Information

Harness Type: Engine

OEM Connector: 12047938

Service Connector: 13580883

Description: 8-Way F 150 Metri-Pack Series, Sealed (L-GY)

Connector Part Information

Harness Type: Right Ignition Coil

OEM Connector: —

Service Connector: Service by Harness - See Part Catalog

Description: 8-Way M

Terminal Part Information

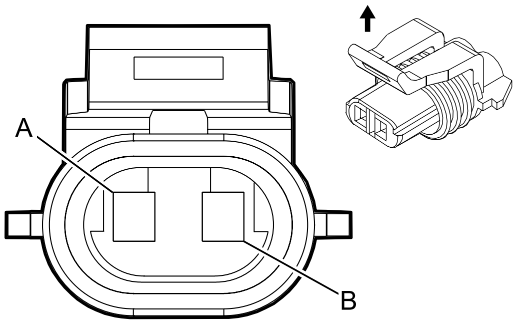
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	Not Available	No Tool Required	Not Required	Not Required	Not Required	Not Required

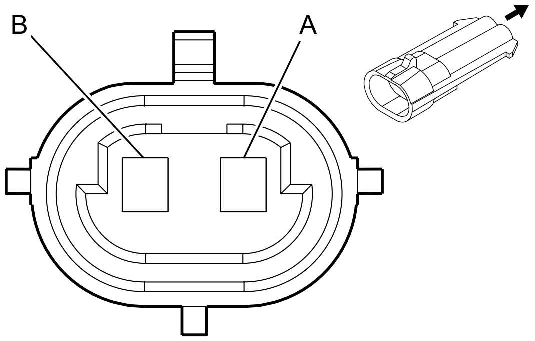
X127 Engine Harness to Right Ignition Coil Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	1	BK	1250	I	—	Ground	A	1	BK	1250	II	—
B	0.8	OG/WH	2122	I	—	Ignition Control 2	B	0.8	OG/WH	2122	II	—

C	0.8	D-GN/WH	2124	I	—	Ignition Control 4	C	0.8	D-GN/WH	2124	II	—
E	0.8	BN/WH	2130	I	—	Ignition Control Low Reference Bank 2	E	0.8	BN/WH	2130	II	—
F	0.8	L-BU/WH	2126	I	—	Ignition Control 6	F	0.8	L-BU/WH	2126	II	—
G	0.8	PU/WH	2128	I	—	Ignition Control 8	G	0.8	PU/WH	2128	II	—
H	1	PK	1239	I	—	Run/Crank Ignition 1 Voltage	H	1	PK	1239	II	—

X141 Instrument Panel Harness to Brake Fluid Level Switch Harness





Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 12052644

Service Connector: 15306302

Description: 2-Way F 150 Metri-Pack Series, Sealed (GY)

Connector Part Information

Harness Type: Brake Fluid Level Switch

OEM Connector: 12162343

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way M 150 Metri-Pack Series (GY)

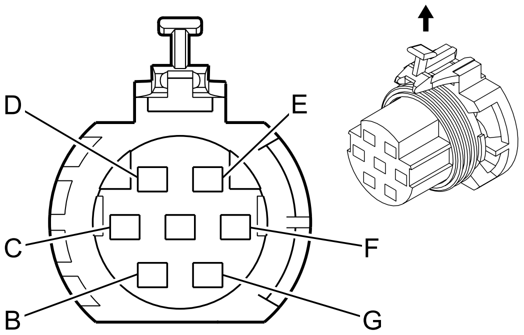
Terminal Part Information

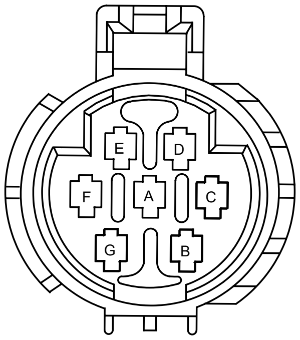
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-3 (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required

X141 Instrument Panel Harness to Brake Fluid Level Switch Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	0.5	TN/WH	33	I	—	Brake Warning Indicator Control	A	0.5	TN/WH	33	II	—
B	0.5	BK/WH	351	I	—	Signal Ground	B	0.5	BK/WH	351	II	—

X150 Instrument Panel Harness to Forward Lamp Harness





Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 12110751

Service Connector: 12110751

Description: 7-Way F 280 Metri-Pack Flexlock Series, Sealed (BK)

Connector Part Information

Harness Type: Forward Lamp

OEM Connector: 12110753

Service Connector: 12110753

Description: 7-Way M 280 Metri-Pack Series, Sealed (BK)

Terminal Part Information

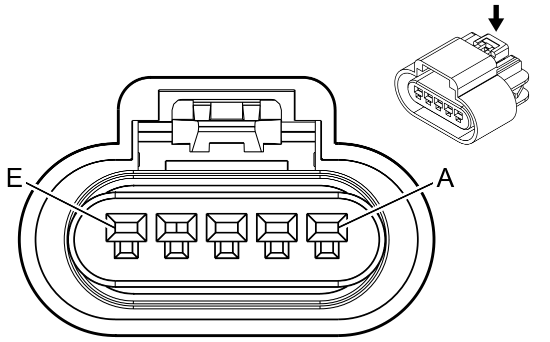
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-5 (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

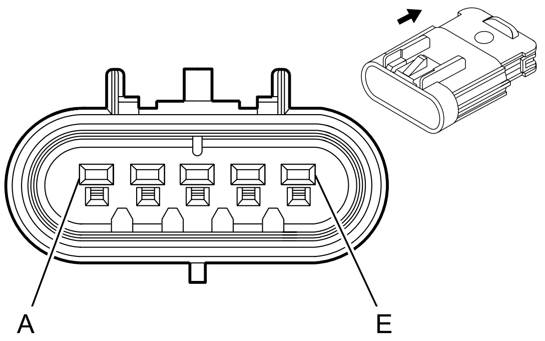
X150 Instrument Panel Harness to Forward Lamp Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	0.5	PK/BK	109	I	—	Hood Ajar Switch Signal	A	0.5	PK/BK	109	II	—
B	0.5	PU	5531	I	—	Hood Closed Switch Signal	B	0.5	PU	5531	II	—

C	0.5	D-GN/WH	636	I	—	Outside Ambient Air Temperature Sensor Signal	C	0.5	D-GN/WH	636	II	—
D	0.5	YE	61	I	—	Outside Ambient Temperature Sensor Low Reference	D	0.5	YE	61	II	—
E	0.8 0.5	L-GN BK/YE	2032 407	I I	L20/L96 LWN	Coolant Temperature Sensor Signal Sensor Low Reference	E	0.8 0.5	L-GN BK/YE	2032 407	II II	L20/L96 LWN
F	0.8 0.5	L-BU/BK L-GN/BK	6813 735	I I	L20/L96 LWN	Coolant Temperature Sensor 2 Low Reference Outside Ambient Air Temperature Sensor Signal	F	0.8 0.5	L-BU/BK L-GN/BK	6813 735	II II	L20/L96 LWN
G	—	—	—	—	—	Not Occupied	G	—	—	—	—	—

X177 Engine Harness to Camshaft Position Sensor Jumper Harness





Connector Part Information

Harness Type: Engine

OEM Connector: 13519051

Service Connector: 13585858

Description: 5-Way F 150 GT Series, Sealed (BK)

Connector Part Information

Harness Type: Camshaft Position Sensor Jumper

OEM Connector: —

Service Connector: Service by Harness - See Part Catalog

Description: 5-Way M

Terminal Part Information

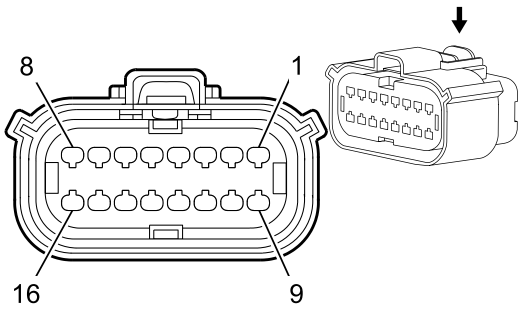
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	Not Available	No Tool Required	Not Required	Not Required	Not Required	Not Required

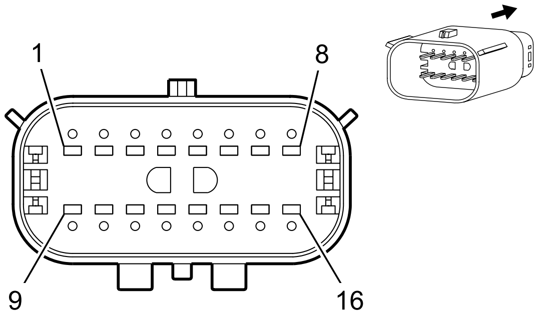
X177 Engine Harness to Camshaft Position Sensor Jumper Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	0.8	D-BU	6259	I	—	Camshaft CAM W Control	A	0.8	D-BU	6259	II	—
B	0.8	BN	6266	I	—	Camshaft CAM W Ground	B	0.8	BN	6266	II	—

C	0.8	D-BU/WH	6265	I	—	Camshaft CAM W Signal	C	0.8	D-BU/WH	6265	II	—
D	0.8	PU	5284	I	—	Camshaft Phaser Intake Solenoid 1	D	0.8	PU	5284	II	—
E	0.8	TN	2199	I	—	Camshaft Phaser Solenoid Low Reference	E	0.8	TN	2199	II	—

X185 Instrument Panel Harness to Chassis Harness





Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 13778557

Service Connector: 13584788

Description: 16-Way F 1.5 Series, Sealed (BK)

Connector Part Information

Harness Type: Chassis

OEM Connector: 13551665

Service Connector: 19300393

Description: 16-Way M 150 MX Series, Sealed (BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575808	J-35616-2A (GY)	J-38125-217	Not Available	Not Available	Not Available	Not Available
II	19119440	J-35616-3 (GY)	J-38125-217	Not Available	Not Available	Not Available	Not Available

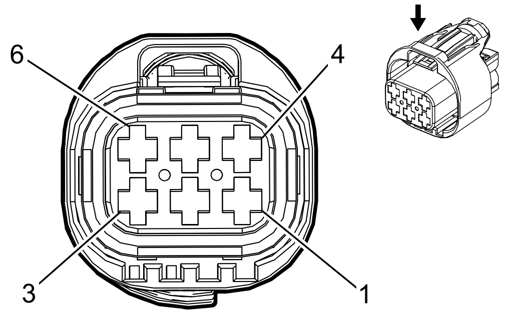
X185 Instrument Panel Harness to Chassis Harness

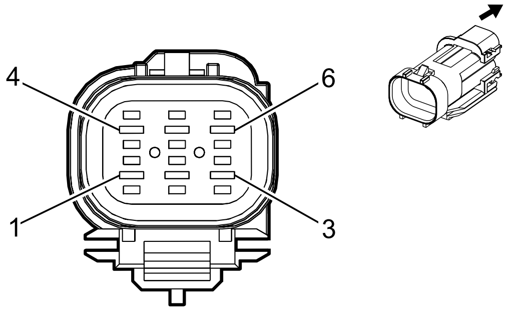
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
1	—	—	—	—	—	Not Occupied	1	—	—	—	—	—
2	0.5	BK/PU	7499	I	—	Yaw Rate Sensor Low Reference	2	0.5	BK/PU	7499	II	—
3	0.5	OG/BK	6045	I	—	Steering Angle Sensor	3	0.5	OG/BK	6045	II	—

3	0.5					Low Reference	3	0.5				
4	0.5	WH	2501	I	—	High Speed GMLAN Serial Data (-) 1	4	0.5	TN	2501	II	—
5	0.5	L-GN	6043	I	—	Steering Angle Sensor Signal	5	0.5	L-GN	6043	II	—
6	0.5	YE	6046	I	—	Steering Angle Sensor Phase A Signal	6	0.5	YE	6046	II	—
7	0.5	WH/BK	6436	I	—	CAN Bus Low Terminated Serial Data	7	0.5	WH/BK	6436	II	—
8 - 9	—	—	—	—	—	Not Occupied	8 - 9	—	—	—	—	—
10	0.5	GY/BK	1337	I	—	Yaw Rate Sensor 5V Reference	10	0.5	GY/BK	1337	II	—
11	0.5	GY	6044	I	—	Steering Angle Sensor 5V Reference	11	0.5	GY	6044	II	—
12	0.5	D-BU	2500	I	—	High Speed GMLAN Serial Data (+) 1	12	0.5	TN/BK	2500	II	—
13	0.5	TN	6048	I	—	Steering Angle Sensor Phase C Signal	13	0.5	TN	6048	II	—
14	0.5	D-BU	6047	I	—	Steering Angle Sensor Phase B Signal	14	0.5	D-BU	6047	II	—
15	0.5	BN/WH	6437	I	—	CAN Bus High Terminated Serial Data	15	0.5	BN/WH	6437	II	—
16	—	—	—	—	—	Not Occupied	16	—	—	—	—	—

16	—	—	—	—	—	Not Occupied	16	—	—	—	—	—

X190 Accessory Harness to Accessory Power Fuse Block Rear Extension Harness





Connector Part Information

Harness Type: Accessory

OEM Connector: 10865192

Service Connector: Service by Harness - See Part Catalog

Description: 6-Way F 2.8 Junior Power Timer Series, Sealed (BK)

Connector Part Information

Harness Type: Accessory Power Fuse Block Rear Extension

OEM Connector: 10865189

Service Connector: Service by Harness - See Part Catalog

Description: 6-Way M 2.8 Series, Sealed (BK)

Terminal Part Information

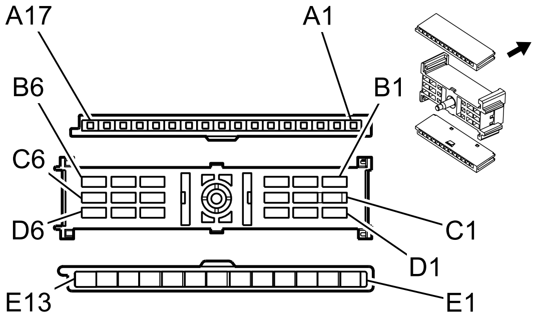
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-5 (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

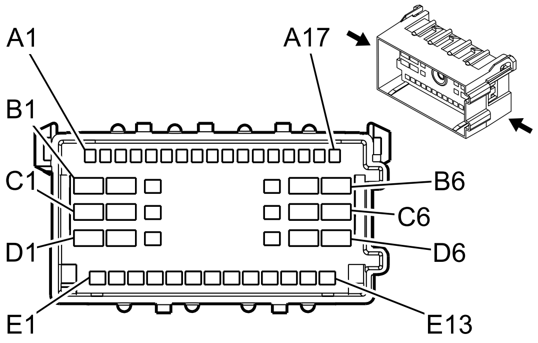
X190 Accessory Harness to Accessory Power Fuse Block Rear Extension Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
1	0.5	L-BU	6842	I	—	Auxiliary Device Relay 1 Control	1	0.5	BK/L-BU	6842	II	—
2	2.5	L-GN	6839	I	—	Auxiliary Device 1 Switched Voltage	2	2.5	L-GN	6839	II	—

3	0.5	D-BU	6843	I	—	Auxiliary Device Relay 2 Control	3	0.5	D-BU	6843	II	—
4	2.5	D-GN	6840	I	—	Auxiliary Device 2 Switched Voltage	4	2.5	D-GN	6840	II	—
5	1	RD/WH	5440	I	—	Battery Positive Voltage	5	1	RD/WH	5440	II	—
6	—	—	—	—	—	Not Occupied	6	—	—	—	—	—

X200 Steering Column Harness to Instrument Panel Harness





Connector Part Information

Harness Type: Steering Column

OEM Connector: —

Service Connector: Service by Harness - See Part Catalog

Description: 48-Way F

Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 15492579

Service Connector: 88988982

Description: 48-Way M 150, 280, 630 Metri-Pack Series (BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Available	No Tool Required	Not Available	Not Required	Not Required	Not Required	Not Required
II	13575463	J-35616-3 (GY)	J-38125-12A	12047581	Delphi 2	E	C
III	13575715	J-35616-5 (PU)	J-38125-11A	12034047	Delphi 2	E	A
IV	19330180	J-35616-43 (RD)	J-38125-11A	12020126	Delphi 2	E	A

X200 Steering Column Harness to Instrument Panel Harness

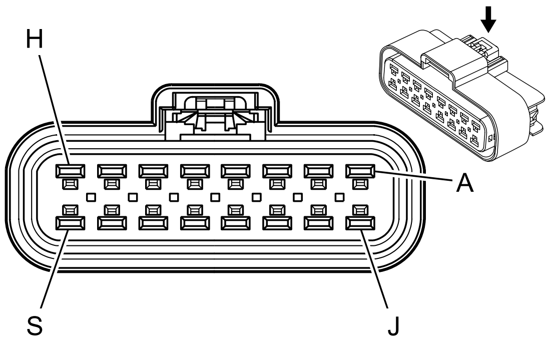
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A9	0.35	PK	3	I	—	Run/Crank Ignition 1 Voltage	A9	0.35	PK	3	II	—

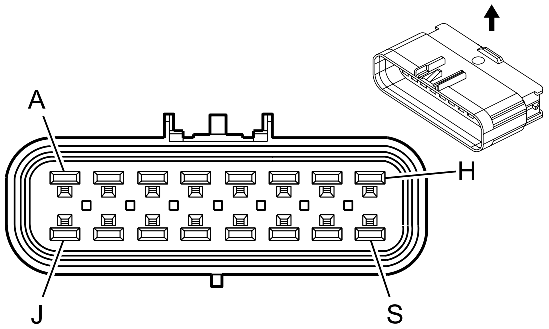
A1	0.35	TN	28	I	—	Horn Relay Control	A1	0.35	TN	28	II	—
D5	0.5	L-GN	6043	I	—	Steering Angle Sensor Signal	D5	0.5	L-GN	6043	IV	—
D4	0.5	TN/WH	816	I	—	Brake Transmission Shift Interlock Solenoid Control	D4	0.5	TN/WH	816	III	—
D3	0.35	YE	525	I	—	Headlamp Dimmer Switch Low Beam Signal	D3	0.35	YE	525	III	—
D1	0.35	TN/BK	6009	I	—	Windshield Wiper Switch Low Reference	D1	0.35	TN/BK	6009	IV	—
C6	0.35	BN	4	I	—	Accessory Ignition Voltage	C6	0.35	BN	4	IV	—
C3	0.35	YE	307	I	—	Headlamp Switch Flash To Pass Signal	C3	0.35	YE	307	III	—
C1	0.35	WH	530	I	—	Off/Run/Crank Ignition Voltage	C1	0.35	WH	530	IV	—
B6	0.35	PK	1020	I	—	Off/Run/Crank Ignition Voltage	B6	0.35	PK	1020	IV	—
E1	0.5	BK	350	I	—	Ground	E1	0.5	BK	350	III	—
B1	0.35	RD/WH	540	I	—	Battery Positive Voltage	B1	0.35	RD/WH	540	IV	—

E10	0.5	GY	6044	I	—	Steering Angle Sensor 5V Reference	E10	0.5	GY	6044	III	—
A6	0.5	PK	2239	I	—	Run/Crank Ignition 1 Voltage	A6	0.5	PK	2239	II	—
A4	0.35	PU	5526	I	—	Tap Up/Tap Down Switch Signal	A4	0.35	PU	5526	II	—
A3	0.35	PK	1444	I	—	12V Reference	A3	0.35	PK	1444	II	—
A17	0.35	GY	1884	I	—	Cruise Control Set/Coast/Resume/Accelerate Switch Signal	A17	0.35	GY	1884	II	—
A16	0.5	TN	6048	I	—	Steering Angle Sensor Phase C Signal	A16	0.5	TN	6048	II	—
A15	0.35	BN	6136	I	—	Control	A15	0.35	BN	6136	II	—
A14	0.5	D-BU	6047	I	—	Steering Angle Sensor Phase B Signal	A14	0.5	D-BU	6047	II	—
A13	0.35	D-GN/WH	7158	I	—	Cruise Control Indicator Dimming Signal	A13	0.35	D-GN/WH	7158	II	—
A12	0.5	YE	6046	I	—	Steering Angle Sensor Phase A Signal	A12	0.5	YE	6046	II	—
A11	0.35	L-GN	6818	I	—	Steering Wheel Resistor Ladder Signal 1	A11	0.35	L-GN	6818	II	—

B3	0.35	WH	111	I	—	Hazard Switch Signal	B3	0.35	WH	111	III	—
E11	0.35	L-BU	1714	I	—	Windshield Wiper Switch Low Signal	E11	0.35	L-BU	1714	III	—
E12	0.35	L-GN	1715	I	—	Windshield Wiper Switch High Signal	E12	0.35	L-GN	1715	III	—
E13	0.35	D-GN	5060	I	—	Low Speed GMLAN Serial Data	E13	0.35	D-GN	5060	III	—
E3	0.5	BK/WH	351	I	—	Signal Ground	E3	0.5	BK/WH	351	III	—
E4	0.5	OG/BK	6045	I	—	Steering Angle Sensor Low Reference	E4	0.5	OG/BK	6045	III	—
E8	0.35	D-GN	663	I	—	Hazard Switch Left Turn Signal	E8	0.35	D-GN	663	III	—
E9	0.35	TN	664	I	—	Hazard Switch Right Turn Signal	E9	0.35	TN	664	III	—
D6	0.35	PK	94	I	—	Windshield Washer Switch Signal	D6	0.35	PK	94	IV	—
A2 - E7	—	—	—	—	—	Not Occupied	A2 - E7	—	—	—	—	—

X202 Instrument Panel Harness to Engine Harness





Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 15326666

Service Connector: 15326666

Description: 16-Way F 280 GT Series, Sealed (BK)

Connector Part Information

Harness Type: Engine

OEM Connector: 15326667

Service Connector: 88986347

Description: 16-Way M 280 GT Series, Sealed (BK)

Terminal Part Information

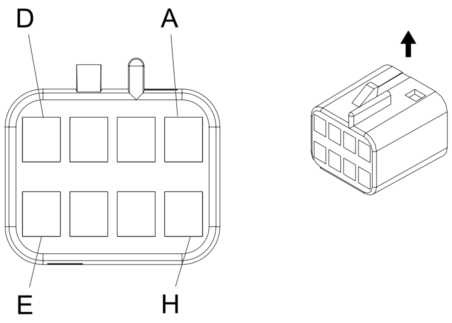
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13576356	J-35616-4A (PU)	J-38125-553	15304719	Delphi 19	E	5
II	13580826	J-35616-5 (PU)	J-38125-553	15304731	Delphi 19	E	5

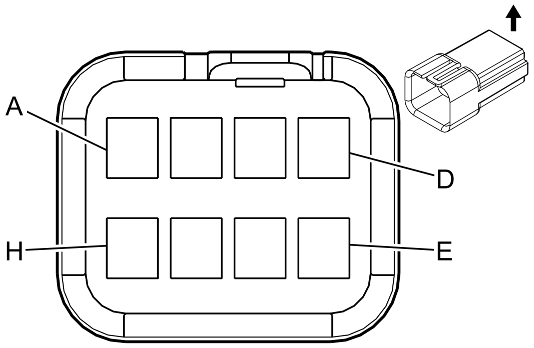
X202 Instrument Panel Harness to Engine Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	0.5	PU	2378	I	—	Right Rear Corner Object Sensor Signal	A	0.5	PU	2378	II	—
B	0.5	D-GN	2377	I	—	Right Rear Middle Object Sensor Signal	B	0.5	D-GN	2377	II	—

C	0.5	RD/WH	840	I	—	Battery Positive Voltage	C	0.5	RD/WH	840	II	—
D - E	—	—	—	—	—	Not Occupied	D - E	—	—	—	—	—
F	0.5	BN	5360	I	—	Brake Apply Sensor Low Reference	F	0.5	BN	5360	II	—
G	0.5	D-BU	2374	I	—	Object Sensor Control	G	0.5	D-BU	2374	II	—
H	0.5	YE	2375	I	—	Left Rear Corner Object Sensor Signal	H	0.5	YE	2375	II	—
J	0.5	GY	2379	I	—	Object Sensor Low Reference	J	0.5	GY	2379	II	—
K - L	—	—	—	—	—	Not Occupied	K - L	—	—	—	—	—
M	0.5	RD/WH	4892	I	—	Auxiliary Battery Relay Control	M	0.5	RD/WH	4892	II	—
N	—	—	—	—	—	Not Occupied	N	—	—	—	—	—
P	0.5	YE	5361	I	—	Brake Apply Sensor Signal	P	0.5	YE	5361	II	—
R	0.5	WH	5359	I	—	Brake Apply Sensor Control	R	0.5	WH	5359	II	—
S	0.5	OG	2376	I	—	Left Rear Middle Object Sensor Signal	S	0.5	OG	2376	II	—

X204 Body Harness to Headliner Harness





Connector Part Information

Harness Type: Body

OEM Connector: 12047886

Service Connector: 13584485

Description: 8-Way F 150 Metri-Pack Series (BK)

Connector Part Information

Harness Type: Headliner

OEM Connector: 12045688

Service Connector: 13584253

Description: 8-Way M 150 Metri-Pack Series (BK)

Terminal Part Information

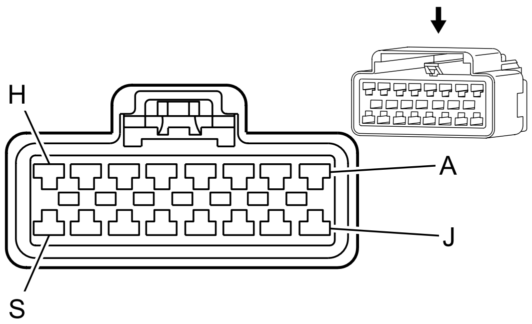
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-3 (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required

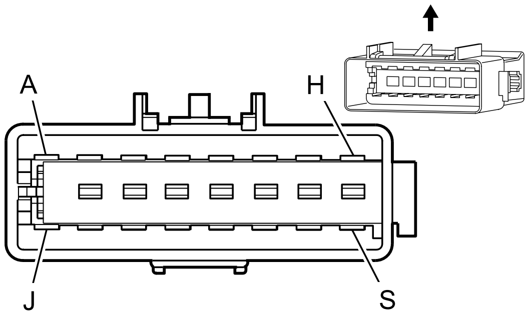
X204 Body Harness to Headliner Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	—	—	—	—	—	Camera Rear Vision Signal +	A	0.5	WH	7641	II	—
B	—	—	—	—	—	Camera Rear Vision Signal (-)	B	0.5	BU	7642	II	—

C	0.35	BARE	6799	I	—	Camera Shield Ground	C	0.5	BARE	6799	II	—
D - E	—	—	—	—	—	Not Occupied	D - E	—	—	—	—	—
F	0.5	L-GN	24	I	—	Backup Lamp Control	F	0.5	L-GN	24	II	—
G	0.8	D-GN	654	I	—	Cellular Telephone Microphone Low Reference	G	0.8	D-GN	654	II	—
H	0.8	GY	655	I	—	Cellular Telephone Microphone Signal	H	0.8	GY	655	II	—

X205 Headliner Harness to Body Harness





Connector Part Information

Harness Type: Headliner

OEM Connector: 15326952

Service Connector: 15306426

Description: 16-Way F 280 GT Series (BK)

Connector Part Information

Harness Type: Body

OEM Connector: 13573920

Service Connector: 15326956

Description: 16-Way M 280 GT Series (BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575753	J-35616-4A (PU)	J-38125-553	15304711	Delphi 8	2	A
II	13575753	J-35616-4A (PU)	J-38125-553	15304711	Delphi 8	E	A
III	13575505	J-35616-5 (PU)	J-38125-553	15304722	Delphi 8	E	C
IV	13575507	J-35616-5 (PU)	J-38125-553	15304724	Delphi 8	2	A

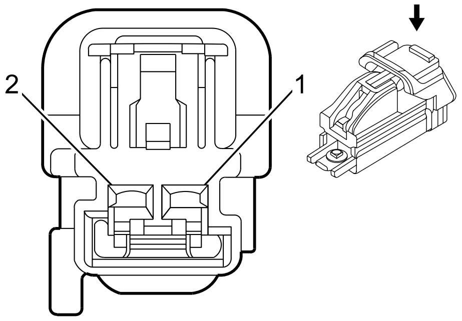
X205 Headliner Harness to Body Harness

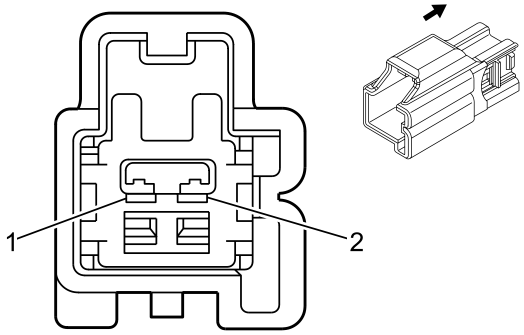
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	0.35	BN	441	II	—	Run Ignition 3 Voltage	A	0.35	BN	441	III	—

B	0.5 0.8	PU/WH D-GN	5264 654	II I	5BV UI8-UE1	Dual Logic Module Rear Mode Signal Cellular Telephone Microphone Low Reference	B	0.5	PU/WH	5264	III	—
C	0.5 0.8	PK/BK GY	5265 655	II I	5BV UI8-UE1	Dual Logic Module Rear Control Signal Cellular Telephone Microphone Signal	C	0.5	PK/BK	5265	III	—
D	0.35	GY	2599	II	—	Rear Mode Motor Signal	D	0.35	GY	2599	III	—
E	0.5	WH	1924	II	—	Auxiliary Blower Motor High Speed Control	E	0.35	WH	1924	III	—
F	0.35	BN	341	II	—	Run Ignition 3 Voltage	F	0.35	BN	341	III	—
G	0.8 1	BK BK	1850 1850	I I	C69/DH6-YF1 -C69-DH6/YF1	Ground Ground	G	1	BK	1850	IV	—
H	0.5	D-BU/WH	149	II	—	Courtesy Lamp Control	H	0.5	D-BU/WH	149	III	—
J	0.35 0.5	BK/WH BK/WH	351 351	II II	U80 UJ1	Signal Ground Signal Ground	J	0.35	BK/WH	351	III	—

K	0.5	BN	5263	II	—	Dual Logic Module Rear Temperature Signal	K	0.5	BN	5263	III	—
L	0.35	D-GN	6134	II	—	Local Interconnect Network Serial Data Bus 3	L	0.35	D-GN	6134	III	—
M	0.35	OG	2775	II	—	Rear Air Temperature Motor Control	M	0.35	OG	2775	III	—
N	0.5	OG	1925	II	—	Auxiliary Blower Motor Medium Speed Control	N	0.35	OG	1925	III	—
P	0.5	D-BU	1926	II	—	Auxiliary Blower Motor Low Speed Control	P	0.35	D-BU	1926	III	—
R	0.35	BN/WH	230	II	—	Instrument Panel Lamp Dimming Control	R	0.35	BN/WH	230	III	—
S	0.5 0.8	OG OG	1732 1732	II I	5BV -5BV	Electronic Control Unit 12V Reference 3 Electronic Control Unit 12V Reference 3	S	0.8	OG	1732	IV	—

X206 Instrument Panel Harness to Instrument Panel Harness





Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 10846794

Service Connector: 88988504

Description: 2-Way F 1.5 YESC Series (L-GY)

Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 10846798

Service Connector: 88988503

Description: 2-Way M 1.5 Series (L-GY)

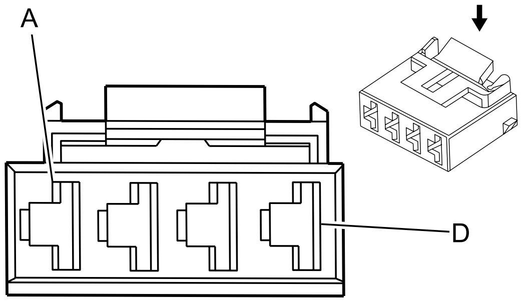
Terminal Part Information

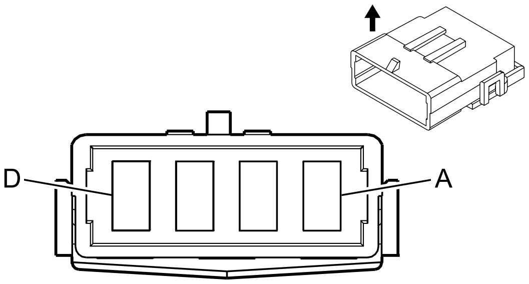
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-3 (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required

X206 Instrument Panel Harness to Instrument Panel Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
1	0.5	L-BU	20	I	—	Stop Lamp Control	1	0.5	L-BU	20	II	—
2	0.5	BK	350	I	—	Ground	2	0.5	BK	350	II	—

X222 Upfitter Provision Harness to Instrument Panel Harness





Connector Part Information

Harness Type: Upfitter Provision

OEM Connector: —

Service Connector: Service by Harness - See Part Catalog

Description: 4-Way F

Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 12052623

Service Connector: 15306008

Description: 4-Way M 630 Metri-Pack Series (BK)

Terminal Part Information

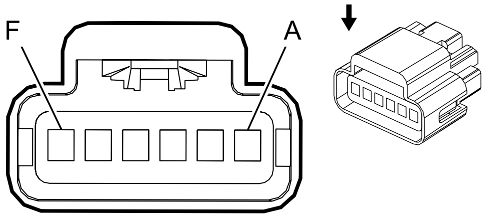
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Available	No Tool Required	Not Available	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-43 (RD)	No Tool Required	Not Required	Not Required	Not Required	Not Required

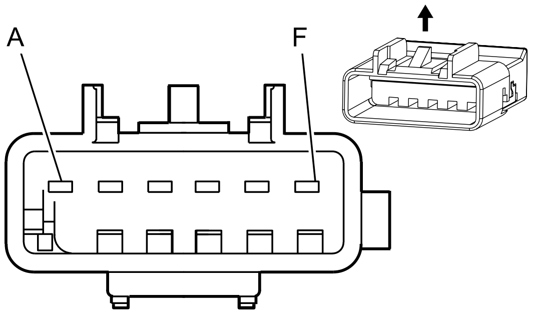
X222 Upfitter Provision Harness to Instrument Panel Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
C	5	BK	350	I	—	Ground	C	5	BK	350	II	—
B	5	BN	541	I	—	Run Ignition 3 Voltage	B	5	BN	541	II	—

A - D	—	—	—	—	—	Not Occupied	A - D	—	—	—	—	—

X225 Accelerator Pedal Position Sensor Harness to Instrument Panel Harness





Connector Part Information

Harness Type: Accelerator Pedal Position Sensor

OEM Connector: 13667186

Service Connector: Service by Harness - See Part Catalog

Description: 6-Way F 150 GT FBT Series (BK)

Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 15332142

Service Connector: 89046638

Description: 6-Way M 150 GT Series (BK)

Terminal Part Information

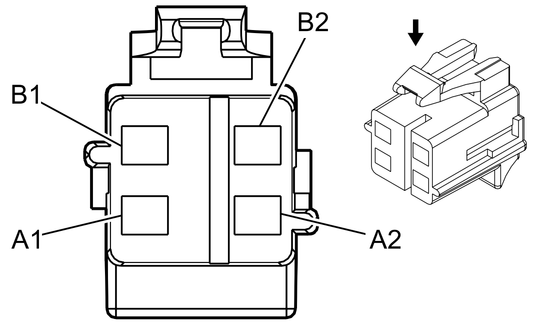
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-2A (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-3 (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required

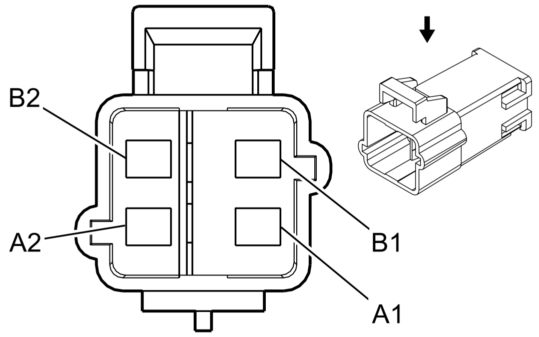
X225 Accelerator Pedal Position Sensor Harness to Instrument Panel Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	0.35	TN	1274	I	—	Accelerator Pedal Position 5V Reference 2	A	0.35	BN/RD	1274	II	—
B	0.35	WH/BK	1164	I	—	Accelerator Pedal Position 5V Reference 1	B	0.35	WH/RD	1164	II	—

C	0.35	D-BU	1161	I	—	Accelerator Pedal Position Signal 1	C	0.35	YE/WH	1161	II	—
D	0.35	BN	1271	I	—	Accelerator Pedal Position Low Reference 1	D	0.35	BK/D-BU	1271	II	—
E	0.35	PU	1272	I	—	Accelerator Pedal Position Low Reference 2	E	0.35	BK/VT	1272	II	—
F	0.35	L-BU	1162	I	—	Accelerator Pedal Position Signal 2	F	0.35	L-GN/WH	1162	II	—

X276 Steering Wheel Harness to Instrument Panel Harness





Connector Part Information

Harness Type: Steering Wheel

OEM Connector: —

Service Connector: Service by Harness - See Part Catalog

Description: 4-Way F

Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 15336476

Service Connector: 88987998

Description: 4-Way M 280 Metri-Pack Series (YE)

Terminal Part Information

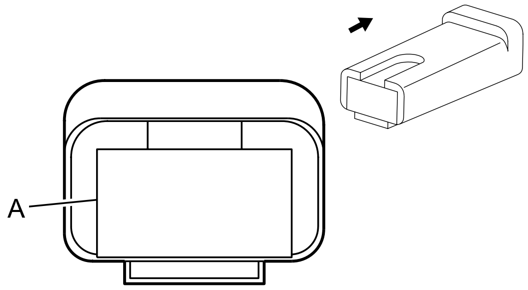
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Available	No Tool Required	Not Available	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-5 (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

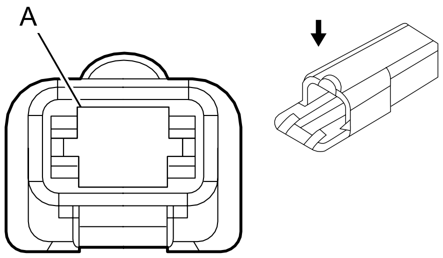
X276 Steering Wheel Harness to Instrument Panel Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A2	0.5	BN	3020	I	—	Steering Wheel Module Stage 1 Low Control	A2	0.5	BN	3020	II	—
A1	0.5	TN	3021	I	—	Steering Wheel Module Stage 1 High Control	A1	0.5	TN	3021	II	—

B1 - B2	—	—	—	—	—	Not Occupied	B1 - B2	—	—	—	—	—

X289 Side Access Panel Harness to Instrument Panel Harness





Connector Part Information

Harness Type: Side Access Panel

OEM Connector: —

Service Connector: Service by Harness - See Part Catalog

Description: 1-Way F

Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 2984528

Service Connector: 02984528

Description: 1-Way M 56 Series (BK)

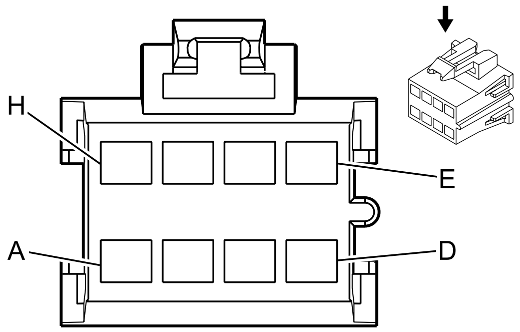
Terminal Part Information

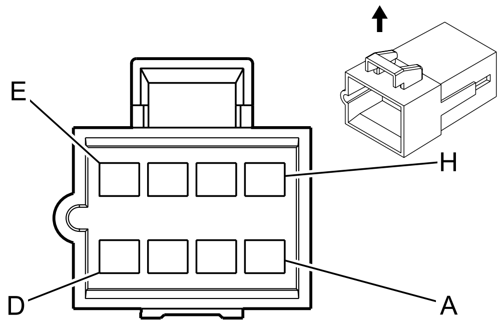
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Available	No Tool Required	Not Available	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-43 (RD)	No Tool Required	Not Required	Not Required	Not Required	Not Required

X289 Side Access Panel Harness to Instrument Panel Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	5	RD/BK	1042	I	—	Battery Positive Voltage	A	5	RD/BK	1042	II	—

X290 Instrument Panel Harness to Side Access Panel Harness





Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 12064998

Service Connector: 15306189

Description: 8-Way F 280 Metri-Pack Series (BK)

Connector Part Information

Harness Type: Side Access Panel

OEM Connector: —

Service Connector: Service by Harness - See Part Catalog

Description: 8-Way M

Terminal Part Information

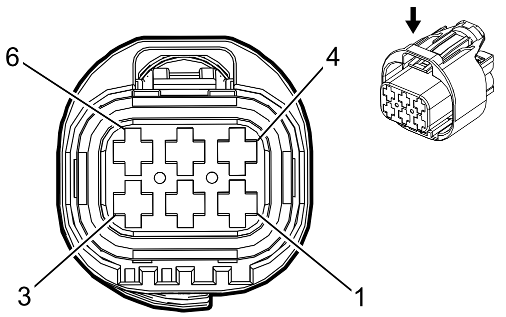
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	Not Available	No Tool Required	Not Required	Not Required	Not Required	Not Required

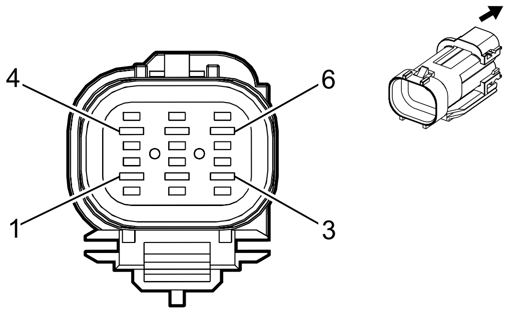
X290 Instrument Panel Harness to Side Access Panel Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	0.5	L-BU	244	I	—	Passenger Door Lock Switch Lock Control	A	0.5	L-BU	244	II	—
B	0.5	L-BU	1344	I	—	Rear Compartment Lid Release Relay Control	B	0.5	L-BU	1344	II	—

C	0.5	L-GN	1391	I	—	Left Front Door Lock Relay Control	C	0.5	L-GN	1391	II	—
D - F	—	—	—	—	—	Not Occupied	D - F	—	—	—	—	—
G	0.8	OG	1732	I	—	Electronic Control Unit 12V Reference 3	G	0.8	OG	1732	II	—
H	0.5	YE	5810	I	—	Park Enable Signal	H	0.5	YE	5810	II	—

X291 Accessory Power Fuse Block Rear Extension Harness to Accessory Power Fuse Block Rear Extension Harness





Connector Part Information

Harness Type: Accessory Power Fuse Block Rear Extension

OEM Connector: 10865192

Service Connector: Service by Harness - See Part Catalog

Description: 6-Way F 2.8 Junior Power Timer Series, Sealed (BK)

Connector Part Information

Harness Type: Accessory Power Fuse Block Rear Extension

OEM Connector: 10865189

Service Connector: Service by Harness - See Part Catalog

Description: 6-Way M 2.8 Series, Sealed (BK)

Terminal Part Information

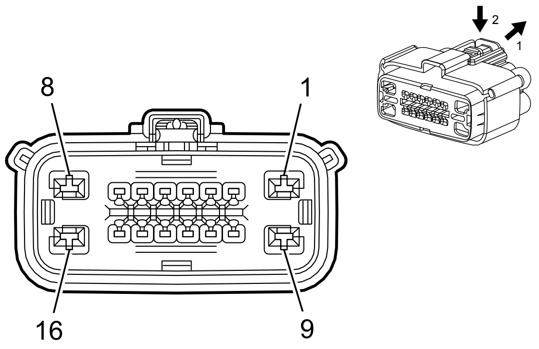
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-5 (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

X291 Accessory Power Fuse Block Rear Extension Harness to Accessory Power Fuse Block Rear Extension Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
1	2.5	D-GN	6840	I	—	Auxiliary Device 2 Switched Voltage	1	2.5	D-GN	6840	II	—
2	2.5	L-GN	6839	I	—	Auxiliary Device 1 Switched Voltage	2	2.5	L-GN	6839	II	—

3	0.5	D-BU	6843	I	—	Auxiliary Device Relay 2 Control	3	0.5	D-BU	6843	II	—
4	0.5	BK/L-BU	6842	I	—	Auxiliary Device Relay 1 Control	4	0.5	BK/L-BU	6842	II	—
5	1	RD/WH	5440	I	—	Battery Positive Voltage	5	1	RD/WH	5440	II	—
6	—	—	—	—	—	Not Occupied	6	—	—	—	—	—

X306 Body Harness to Passenger Seat Harness



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Connector Part Information

Harness Type: Body

OEM Connector: 33197236

Service Connector: 13588096

Description: 16-Way F 1.5, 2.8 Series, Sealed (YE)

Connector Part Information

Harness Type: Passenger Seat

OEM Connector: —

Service Connector: Service by Harness - See Part Catalog

Description: 16-Way M

Terminal Part Information

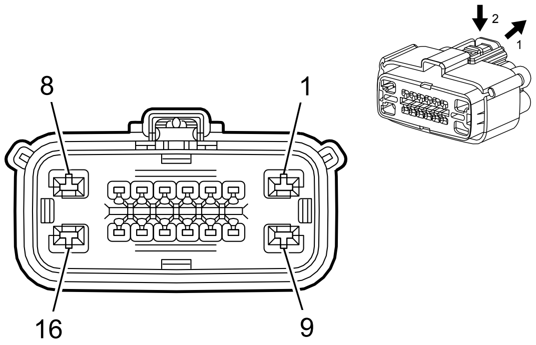
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575808	J-35616-2A (GY)	J-38125-217	Not Available	Not Available	Not Available	Not Available
II	13576375	J-35616-35 (VT)	J-38125-12A	1326030-8	Lear 17	4	D
III	Not Required	Not Available	No Tool Required	Not Required	Not Required	Not Required	Not Required

X306 Body Harness to Passenger Seat Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
1	3	BK	1850	II	—	Ground	1	3	BK	1850	III	—
5	0.5	L-GN	2116	I	—	Passenger Seat Belt Pretensioner High Control	5	0.5	L-GN	2116	III	—
6	0.5	OG	2117	I	—	Passenger Seat Belt Pretensioner Low Control	6	0.5	OG	2117	III	—
9	3	RD/WH	3540	II	—	Battery Positive Voltage	9	3	RD/WH	3540	III	—

10	0.5	L-GN	2136	I	—	Right Front Side Impact Module Low Control	10	0.5	L-GN	2136	III	—
11	0.5	TN/WH	2135	I	—	Right Front Side Impact Module High Control	11	0.5	TN/WH	2135	III	—

X307 Body Harness to Driver Seat Harness



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Connector Part Information

Harness Type: Body

OEM Connector: 33197236

Service Connector: 13588096

Description: 16-Way F 1.5, 2.8 Series, Sealed (YE)

Connector Part Information

Harness Type: Driver Seat

OEM Connector: —

Service Connector: Service by Harness - See Part Catalog

Description: 16-Way M

Terminal Part Information

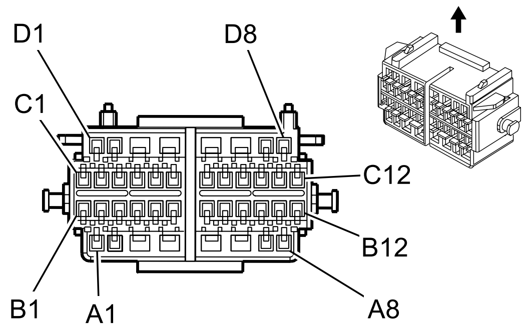
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575808	J-35616-2A (GY)	J-38125-217	Not Available	Not Available	Not Available	Not Available
II	13576375	J-35616-35 (VT)	J-38125-12A	1326030-8	Lear 17	4	D
III	Not Required	Not Available	No Tool Required	Not Required	Not Required	Not Required	Not Required

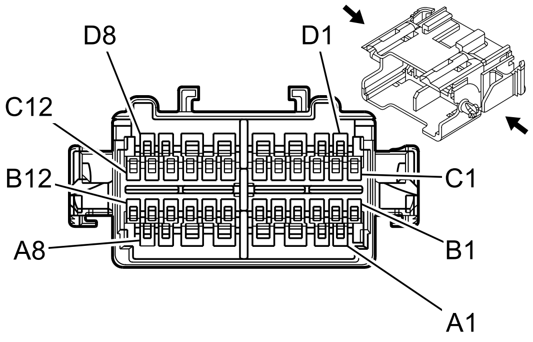
X307 Body Harness to Driver Seat Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
1	3	RD/WH	3540	II	—	Battery Positive Voltage	1	3	RD/WH	3540	III	—
2	0.5	PK	5057	I	—	Seat Position Switch Low Reference	2	0.5	PK	5057	III	—
3	0.5	TN/WH	238	I	—	Driver Seat Belt Switch Signal	3	0.5	TN/WH	238	III	—
5	0.5	TN/WH	2118	I	—	Driver Seat Belt Pretensioner High	5	0.5	TN/WH	2118	III	—

						Pretensioner High Control					
6	0.5	OG/BK	2119	I	—	Driver Seat Belt Pretensioner Low Control	6	0.5	OG/BK	2119	III	—
9	3	BK	450	II	—	Ground	9	3	BK	450	III	—
10	0.5	YE/BK	2138	I	—	Left Front Side Impact Module Low Control	10	0.5	YE/BK	2138	III	—
11	0.5	BN	2137	I	—	Left Front Side Impact Module High Control	11	0.5	BN	2137	III	—

X318 Instrument Panel Harness to Body Harness





Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 15448130

Service Connector: 89046970

Description: 40-Way F 150, 280 GT Series (L-GY)

Connector Part Information

Harness Type: Body

OEM Connector: 15416977

Service Connector: 19331377

Description: 40-Way M 150, 280 GT Series (L-GY)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575735	J-35616-14 (GN)	J-38125-553	12191812	Delphi 19	C	A
II	13575735	J-35616-14 (GN)	J-38125-553	12191812	Delphi 19	E	C
III	13575753	J-35616-4A (PU)	J-38125-553	15304711	Delphi 8	2	A
IV	13575753	J-35616-4A (PU)	J-38125-553	15304711	Delphi 8	E	A
V	13575502	J-35616-3 (GY)	J-38125-553	15304702	Delphi 19	E	4
VI	13575502	J-35616-3 (GY)	J-38125-553	15304702	Delphi 19	E	C
VII	13575505	J-35616-5 (PU)	J-38125-553	15304722	Delphi 8	E	C
VIII	13575507	J-35616-5 (PU)	J-38125-553	15304724	Delphi 8	2	A
IX	19177683	J-35616-3 (GY)	J-38125-553	15304702	Delphi 19	2	4

X318 Instrument Panel Harness to Body Harness

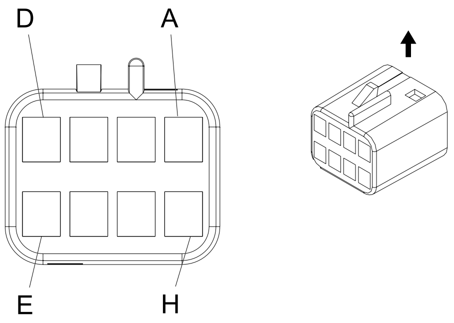
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A1	0.8	OG	1853	I	—	Right Front Midrange Speaker Control (+)	A1	0.8	OG	1853	IX	—
A2	0.8	D-GN	1953	I	—	Right Front Midrange Speaker (-) Low Reference	A2	0.8	D-GN	1953	IX	—
A3	0.5	BK/WH	1751	IV	—	Signal Ground	A3	0.5	BK/WH	1751	VII	—
A4	0.5	TN/BK	371	IV	—	Passenger IP Module Disable Switch Signal	A4	0.5	TN/BK	371	VII	—
A5	0.5	WH/BK	6436	IV	—	CAN Bus Low Terminated Serial Data	A5	0.5	WH/BK	6436	VII	—
A6	0.5	BN/WH	6437	IV	—	CAN Bus High Terminated Serial Data	A6	0.5	BN/WH	6437	VII	—
A7	—	—	—	—	—	Not Occupied	A7	—	—	—	—	—
A8	0.35	YE/BK	1181	II	—	Right Rear Door Open Switch Signal	A8	0.35	YE/BK	1181	VI	—
B1	0.8	L-BU	1320	I	—	CHMSL Control	B1	0.8	L-BU	1320	IX	—
B2	—	—	—	—	—	Not Occupied	B2	—	—	—	—	—
B3	0.8	TN	1855	I	—	Right Rear Midrange Speaker Control (+)	B3	1	TN	1855	IX	—
B4	0.8	OG	1955	I	—	Right Rear Midrange Speaker (-) Low Reference	B4	1	OG	1955	IX	—

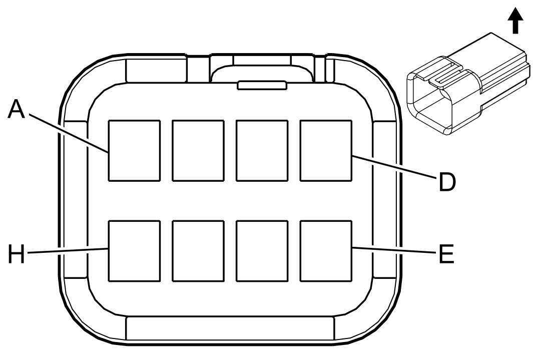
B5	—	—	—	—	—	Not Occupied	B5	—	—	—	—	—
B6	0.5	GY/BK	1337	II	—	Yaw Rate Sensor 5V Reference	B6	0.5	GY/BK	1337	V	—
B7	0.5	D-BU/WH	6619	II	—	Middle Front Discriminating Sensor Low Reference	B7	0.5	D-BU/WH	6619	V	—
B8	0.5	BN/WH	6618	II	—	Middle Front Discriminating Sensor Signal	B8	0.5	BN/WH	6618	V	—
B9	—	—	—	—	—	Not Occupied	B9	—	—	—	—	—
B10	0.35	D-GN	5060	II	—	Low Speed GMLAN Serial Data	B10	0.35	D-GN	5060	VI	—
B11	0.35	D-GN	6134	II	—	Local Interconnect Network Serial Data Bus 3	B11	0.35	D-GN	6134	VI	—
B12	—	—	—	—	—	Not Occupied	B12	—	—	—	—	—
C1	0.8	D-GN	654	I	—	Cellular Telephone Microphone Low Reference	C1	0.8	D-GN	654	IX	—
C2	0.35	PK	1139	II	—	Run/Crank Ignition 1 Voltage	C2	0.35	PK	1139	VI	—
C3	0.8	TN	1859	I	—	Left Rear Midrange Speaker Control (+)	C3	1	TN	1859	IX	—
C4	0.8	WH	1959	I	—	Left Rear Midrange Speaker (-) Low Reference	C4	1	WH	1959	IX	—
C5	0.8	GY	655	I	—	Cellular Telephone Microphone Signal	C5	0.8	GY	655	IX	—

C6	0.5	BK/PU	7499	II	—	Yaw Rate Sensor Low Reference	C6	0.5	BK/PU	7499	V	—
C7	0.35	L-GN	5926	II	—	Rear Access Open Switch Signal	C7	0.35	L-GN	5926	VI	—
C8	0.35	PK/BK	1303	II	—	Lift Gate Ajar Switch Signal 1	C8	0.35	PK/BK	1303	VI	—
C9	0.35	TN/WH	746	II	—	Right Front Door Ajar Switch Signal	C9	0.35	TN/WH	746	VI	—
C10	0.35	L-GN	1177	II	—	Right Front Door Open Switch Signal	C10	0.35	L-GN	1177	VI	—
C11	0.5	TN	126	II	—	Left Front Door Open Switch Signal	C11	0.35	TN	126	VI	—
C12	0.35	GY/BK	745	II	—	Left Front Door Ajar Switch Signal	C12	0.35	GY/BK	745	VI	—
D1	0.8	D-BU	1857	I	—	Left Front Midrange Speaker Control (+)	D1	0.8	D-BU	1857	IX	—
D2	0.8	L-BU	1957	I	—	Left Front Midrange Speaker (-) Low Reference	D2	0.8	L-BU	1957	IX	—
D3	0.8 0.5	OG OG	1732 1732	III IV	PRP -PRP	Electronic Control Unit 12V Reference 3 Electronic Control Unit 12V Reference 3	D3	0.8	OG	1732	VIII	—

D4	0.5	PK	353	IV	—	Passenger IP Module Suppression Indicator Control	D4	0.5	PK	353	VII	—
D5	0.5	PK/BK	780	IV	—	Driver Door Lock Switch Lock Signal	D5	0.35	PK/BK	780	VII	—
D6	0.5 0.35	OG/BK OG/BK	781 781	IV IV	AU3 AU3+PRP	Driver Door Lock Switch Unlock Signal Driver Door Lock Switch Unlock Signal	D6	0.35	OG/BK	781	VII	—
D7	0.35	L-BU	244	II	—	Passenger Door Lock Switch Lock Control	D7	0.35	L-BU	244	VI	—
D8	0.35 0.35	D-BU OG/BK	245 781	II II	AU3 AU3+PRP	Passenger Door Lock Switch Unlock Control Driver Door Lock Switch Unlock Signal	D8	0.35	D-BU	245	VI	—

X319 Auxiliary Heater Front Harness to Body Harness





Connector Part Information

Harness Type: Auxiliary Heater - Front Jumper

OEM Connector: 12047886

Service Connector: Service by Harness - See Part Catalog

Description: 8-Way F 150 Metri-Pack Series (BK)

Connector Part Information

Harness Type: Body

OEM Connector: 12045688

Service Connector: 13584253

Description: 8-Way M 150 Metri-Pack Series (BK)

Terminal Part Information

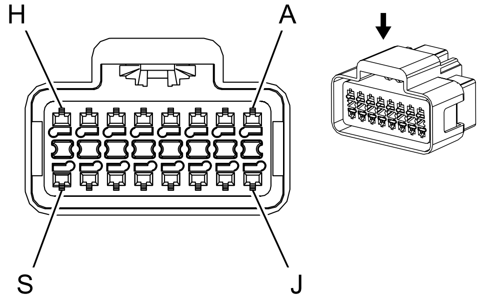
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-3 (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required

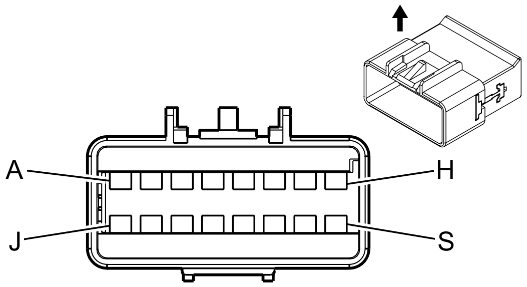
X319 Auxiliary Heater Front Harness to Body Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	0.35	WH	1924	I	—	Auxiliary Blower Motor High Speed Control	A	0.35	WH	1924	II	—
B	0.35	OG	1925	I	—	Auxiliary Blower Motor Medium Speed Control	B	0.35	OG	1925	II	—

C	0.35	D-BU	1926	I	—	Auxiliary Blower Motor Low Speed Control	C	0.35	D-BU	1926	II	—
D	0.35	BN/WH	230	I	—	Instrument Panel Lamp Dimming Control	D	0.35	BN/WH	230	II	—
E	0.35	BK	450	I	—	Ground	E	0.35	BK	450	II	—
F - H	—	—	—	—	—	Not Occupied	F - H	—	—	—	—	—

X320 Upfitter Provision Harness to Body Harness





Connector Part Information

Harness Type: Upfitter Provision

OEM Connector: —

Service Connector: Service by Harness - See Part Catalog

Description: 16-Way F

Connector Part Information

Harness Type: Body

OEM Connector: 13516907

Service Connector: 19153746

Description: 16-Way M 150 GT Series (BK)

Terminal Part Information

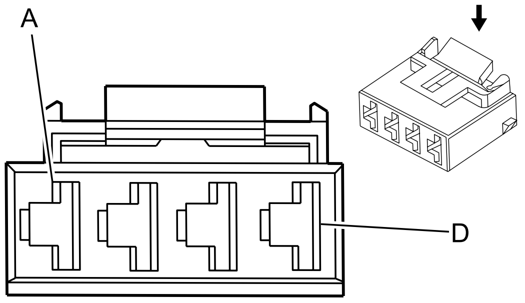
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Available	No Tool Required	Not Available	Not Required	Not Required	Not Required	Not Required
II	13575502	J-35616-3 (GY)	J-38125-553	15304702	Delphi 19	E	4
III	19177683	J-35616-3 (GY)	J-38125-553	15304702	Delphi 19	2	4

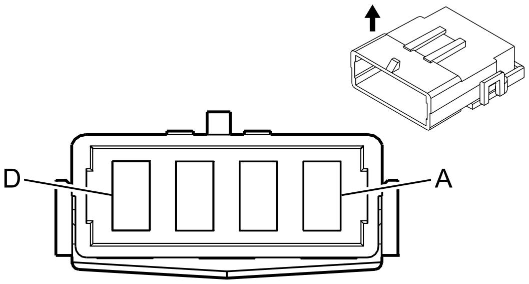
X320 Upfitter Provision Harness to Body Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
S	0.5	BN	2209	I	—	Rear Park Lamp Control	S	0.5	BN	2209	II	—
B	1	TN	1859	I	—	Left Rear Midrange	B	1	TN	1859	III	—

B	1					Speaker Control (+)	B	1				
C	1	OG	1955	I	—	Right Rear Midrange Speaker (-) Low Reference	C	1	OG	1955	III	—
D	1	TN	1855	I	—	Right Rear Midrange Speaker Control (+)	D	1	TN	1855	III	—
P	0.5	BK	450	I	—	Ground	P	0.5	BK	450	II	—
R	0.5	D-BU/WH	149	I	—	Courtesy Lamp Control	R	0.5	D-BU/WH	149	II	—
A	1	WH	1959	I	—	Left Rear Midrange Speaker (-) Low Reference	A	1	WH	1959	III	—
E - N	—	—	—	—	—	Not Occupied	E - N	—	—	—	—	—

X321 Upfitter Provision Harness to Body Harness





Connector Part Information

Harness Type: Upfitter Provision

OEM Connector: —

Service Connector: Service by Harness - See Part Catalog

Description: 4-Way F

Connector Part Information

Harness Type: Body

OEM Connector: 12052623

Service Connector: 15306008

Description: 4-Way M 630 Metri-Pack Series (BK)

Terminal Part Information

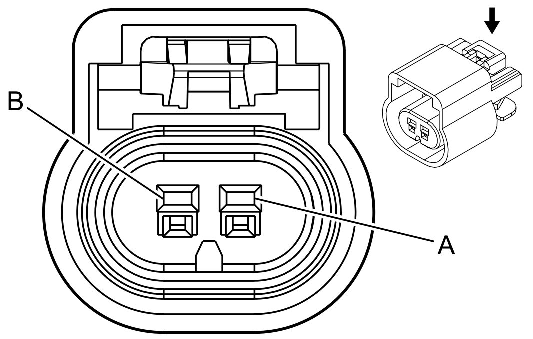
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Available	No Tool Required	Not Available	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-43 (RD)	No Tool Required	Not Required	Not Required	Not Required	Not Required

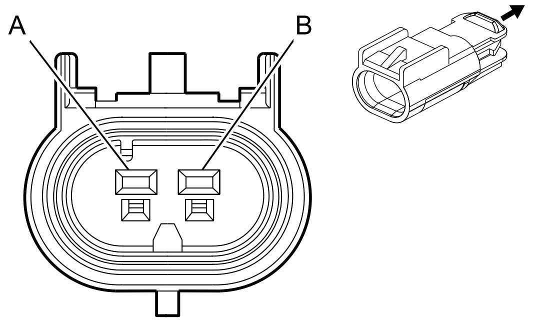
X321 Upfitter Provision Harness to Body Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
C	5	BK	450	I	—	Ground	C	5	BK	450	II	—
B	5	BN	541	I	—	Run Ignition 3 Voltage	B	5	BN	541	II	—

A	5	RD/BK	1042	I	—	Battery Positive Voltage	A	5	RD/BK	1042	II	—
D	—	—	—	—	—	Not Occupied	D	—	—	—	—	—

X323 Air Bag Jumper Harness to Body Harness





Connector Part Information

Harness Type: Air Bag Jumper

OEM Connector: 13510085

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F 150 GT Series, Sealed (BK)

Connector Part Information

Harness Type: Body

OEM Connector: 13510099

Service Connector: 13580103

Description: 2-Way M 150 GT Series, Sealed (BK)

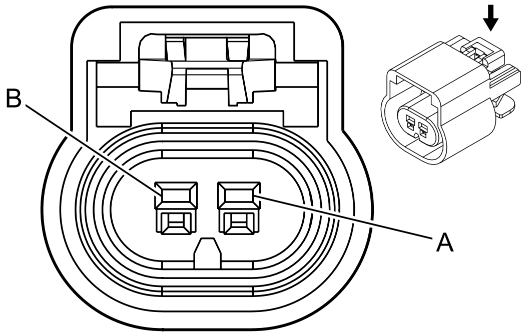
Terminal Part Information

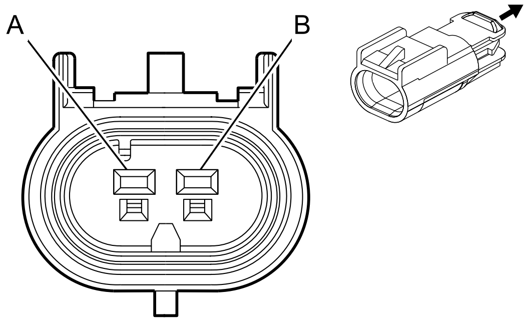
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-3 (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required

X323 Air Bag Jumper Harness to Body Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	0.5	GY/BK	6621	I	—	Left Middle Side Impact Sensing Module Low Reference	A	0.5	GY/BK	6621	II	—
B	0.5	D-GN/WH	6620	I	—	Left Middle Side Impact Sensing Module Signal	B	0.5	D-GN/WH	6620	II	—

X324 Air Bag Jumper Harness to Body Harness





Connector Part Information

Harness Type: Air Bag Jumper

OEM Connector: 13510085

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F 150 GT Series, Sealed (BK)

Connector Part Information

Harness Type: Body

OEM Connector: 13510099

Service Connector: 13580103

Description: 2-Way M 150 GT Series, Sealed (BK)

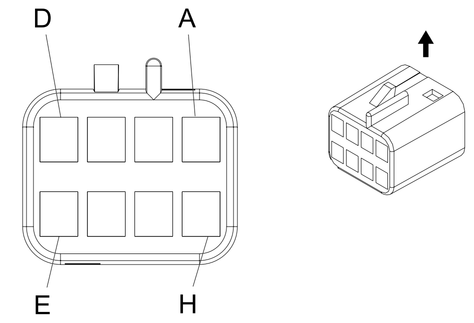
Terminal Part Information

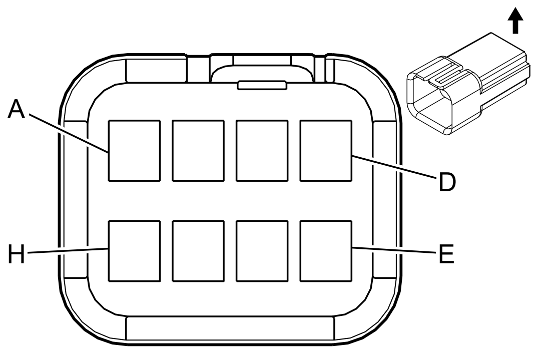
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-3 (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required

X324 Air Bag Jumper Harness to Body Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	0.5	L-GN/WH	6625	I	—	Right Middle Side Impact Sensing Module Low Reference	A	0.5	L-GN/WH	6625	II	—
B	0.5	L-BU/BK	6624	I	—	Right Middle Side Impact Sensing Module Signal	B	0.5	L-BU/BK	6624	II	—

X329 Instrument Panel Harness to Body Harness





Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 12047886

Service Connector: 13584485

Description: 8-Way F 150 Metri-Pack Series (BK)

Connector Part Information

Harness Type: Body

OEM Connector: 12089526

Service Connector: 13584253

Description: 8-Way M 150 Metri-Pack Series (BK)

Terminal Part Information

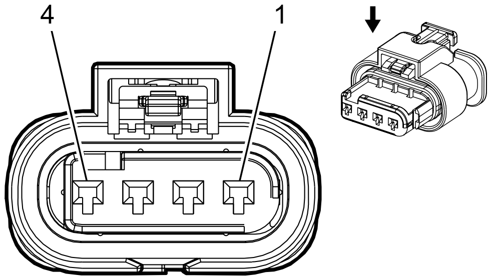
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-3 (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required

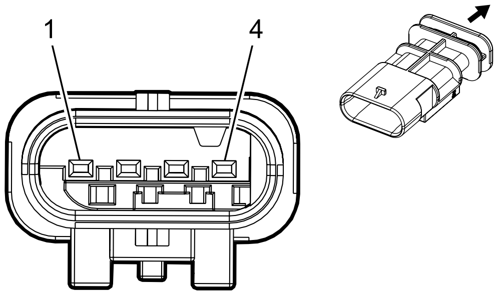
X329 Instrument Panel Harness to Body Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	0.35	WH	7641	I	—	Camera Rear Vision Signal +	A	0.35	WH	7641	II	—
B	0.35	L-BU	7642	I	—	Camera Rear Vision Signal (-)	B	0.35	L-BU	7642	II	—
C	—	—	—	—	—	Not Occupied	C	—	—	—	—	—

D	0.5	L-GN	24	I	—	Backup Lamp Control	D	0.5	L-GN	24	II	—
E	0.5	PK	239	I	—	Run/Crank Ignition 1 Voltage	E	0.5	PK	239	II	—
F	0.5	L-GN	24	I	—	Backup Lamp Control	F	0.5	L-GN	24	II	—
G	—	—	—	—	—	Not Occupied	G	—	—	—	—	—
H	0.35	BARE	6799	I	—	Camera Shield Ground	H	0.35	BARE	6799	II	—

X330 Instrument Panel Harness to Body Harness





Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 13854531

Service Connector: 13586137

Description: 4-Way F 1.2 Series, Sealed (YE)

Connector Part Information

Harness Type: Body

OEM Connector: 13854529

Service Connector: 19299698

Description: 4-Way M 1.2 Series, Sealed (YE)

Terminal Part Information

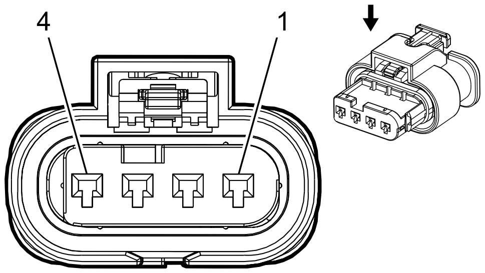
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-16 (LT GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-13 (BU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

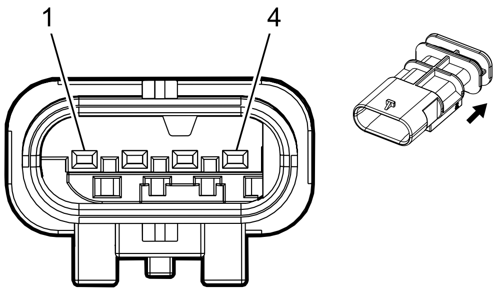
X330 Instrument Panel Harness to Body Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
1	0.5	TN	3021	I	—	Steering Wheel Module Stage 1 High Control	1	0.5	TN	3021	II	—
2	0.5	BN	3020	I	—	Steering Wheel Module Stage 1 Low Control	2	0.5	BN	3020	II	—

3 - 4	—	—	—	—	—	Not Occupied	3 - 4	—	—	—	—	—

X331 Instrument Panel Harness to Body Harness





Connector Part Information

Harness Type: Instrument Panel

OEM Connector: 13854532

Service Connector: 13586575

Description: 4-Way F 1.2 Series, Sealed (YE)

Connector Part Information

Harness Type: Body

OEM Connector: 13854530

Service Connector: 13586576

Description: 4-Way M 1.2 Series, Sealed (YE)

Terminal Part Information

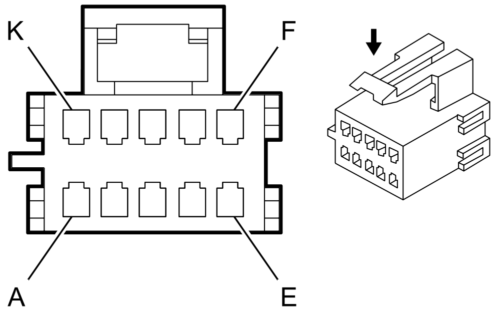
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-16 (LT GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-13 (BU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

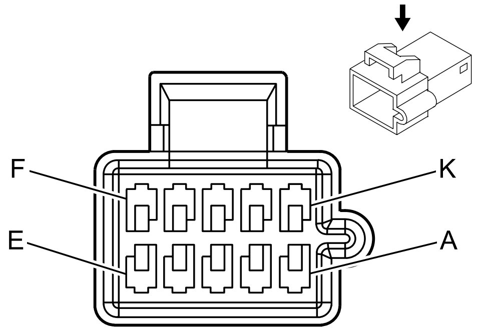
X331 Instrument Panel Harness to Body Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
1	0.5	YE	3025	I	—	Passenger IP Module Stage 1 High Control	1	0.5	YE	3025	II	—
2	0.5	OG	3024	I	—	Passenger IP Module Stage 1 Low Control	2	0.5	OG	3024	II	—

3 - 4	—	—	—	—	—	Not Occupied	3 - 4	—	—	—	—	—

X400 Right Rear Cargo Door Harness to Right Rear Cargo Door Harness





Connector Part Information

Harness Type: Right Rear Cargo Door

OEM Connector: 15324054

Service Connector: Service by Harness - See Part Catalog

Description: 10-Way F 150 Metri-Pack Series (BK)

Connector Part Information

Harness Type: Body

OEM Connector: 15324758

Service Connector: 19179279

Description: 10-Way M 150 Metri-Pack Series (BK)

Terminal Part Information

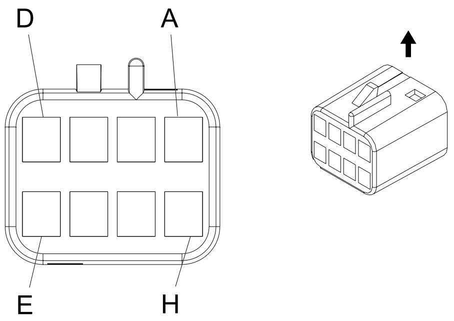
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	13575462	J-35616-3 (GY)	J-38125-12A	12047581	Delphi 2	E	A
III	13575463	J-35616-3 (GY)	J-38125-12A	12047581	Delphi 2	E	C

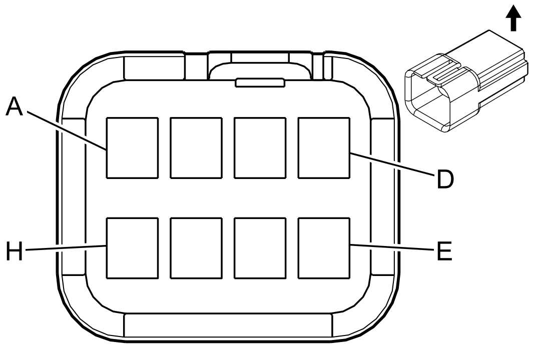
X400 Right Rear Cargo Door Harness to Right Rear Cargo Door Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	1	TN	1855	I	—	Right Rear Midrange Speaker Control (+)	A	1	TN	1855	II	—
B	1	OG	1955	I	—	Right Rear Midrange	B	1	OG	1955	II	—

B	1					Speaker (-) Low Reference	B	1			
C	—	—	—	—	—	Not Occupied	C	—	—	—	—	—
D	0.35	BK/WH	1051	I	—	Signal Ground	D	1	BK/WH	1051	II	—
E	0.35	D-BU	245	I	—	Passenger Door Lock Switch Unlock Control	E	0.35	D-BU	245	III	—
F	1	GY	295	I	—	Door Lock Actuator Lock Control	F	1	GY	295	II	—
G	1	TN/BK	1095	I	—	Right Rear Door Lock Actuator Unlock Control	G	1	TN/BK	1095	II	—
H	0.35	L-GN	5926	I	—	Rear Access Open Switch Signal	H	0.35	L-GN	5926	III	—
J	0.35	PK/BK	1303	I	—	Lift Gate Ajar Switch Signal 1	J	0.35	PK/BK	1303	III	—
K	0.35	L-BU	244	I	—	Passenger Door Lock Switch Lock Control	K	0.35	L-BU	244	III	—

X403 Rearview Camera Harness to Body Harness (Cutaway)





Connector Part Information

Harness Type: Rearview Camera

OEM Connector: 12047886

Service Connector: Service by Harness - See Part Catalog

Description: 8-Way F 150 Metri-Pack Series (BK)

Connector Part Information

Harness Type: Body

OEM Connector: 12045688

Service Connector: 13584253

Description: 8-Way M 150 Metri-Pack Series (BK)

Terminal Part Information

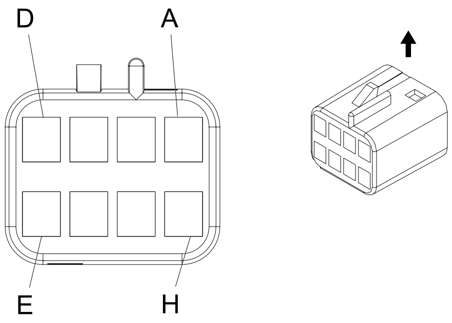
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-3 (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required

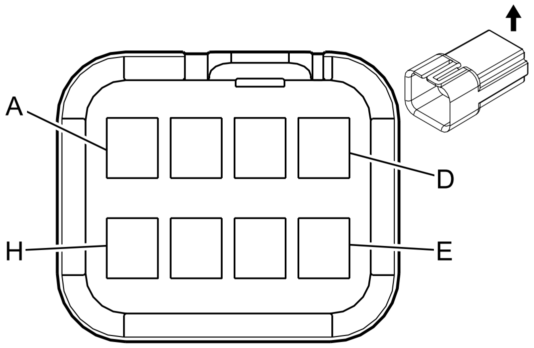
X403 Rearview Camera Harness to Body Harness (Cutaway)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	0.5	WH	7641	I	—	Camera Rear Vision Signal +	A	0.35	WH	7641	II	—
B - D	—	—	—	—	—	Not Occupied	B - D	—	—	—	—	—
E	0.5	PK	239	I	—	Run/Crank Ignition 1 Voltage	E	0.5	PK	239	II	—

F	0.5	L-GN	24	I	—	Backup Lamp Control	F	0.5	L-GN	24	II	—
G	0.5	BK/WH	351	I	—	Signal Ground	G	0.35	BK/WH	351	II	—
H	—	—	—	—	—	Not Occupied	H	—	—	—	—	—

X403 Right Rear Cargo Door Harness to Body Harness (Cargo/Passenger)





Connector Part Information

Harness Type: Right Rear Cargo Door

OEM Connector: 12047886

Service Connector: Service by Harness - See Part Catalog

Description: 8-Way F 150 Metri-Pack Series (BK)

Connector Part Information

Harness Type: Body

OEM Connector: 12089526

Service Connector: 13584253

Description: 8-Way M 150 Metri-Pack Series (BK)

Terminal Part Information

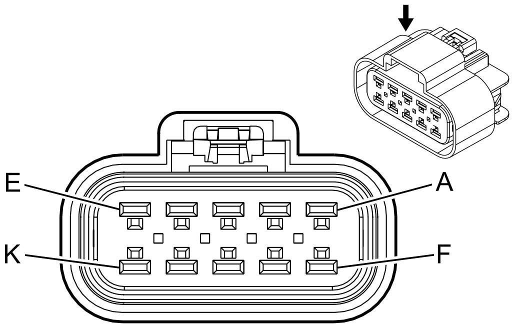
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-3 (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required

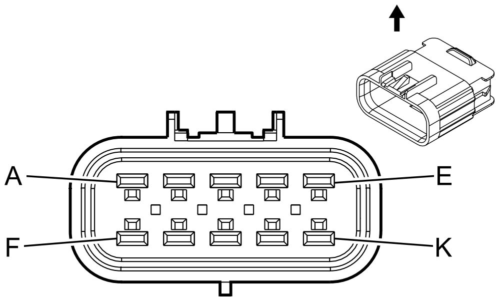
X403 Right Rear Cargo Door Harness to Body Harness (Cargo/Passenger)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	0.5	YE	7641	I	—	Camera Rear Vision Signal +	A	0.5	WH	7641	II	—
B	0.5	L-BU	7642	I	—	Camera Rear Vision Signal (-)	B	0.5	L-BU	7642	II	—
C	—	—	—	—	—	Not Occupied	C	—	—	—	—	—

D	0.5	BK	351	I	—	Signal Ground	D	0.35	BK/WH	351	II	—
E	0.5	PK	239	I	—	Run/Crank Ignition 1 Voltage Run/Crank Ignition 1 Voltage	E	0.5	PK	239	II	—
F	0.5	L-GN	24	I	—	Backup Lamp Control	F	0.5	L-GN	24	II	—
G	—	—	—	—	—	Not Occupied	G	—	—	—	—	—
H	0.5	BARE	6799	I	—	Camera Shield Ground	H	0.5	BARE	6799	II	—

X405 Chassis Harness to Cutaway Jumper Harness (-5H4 Except Cutaway)





Connector Part Information

Harness Type: Chassis

OEM Connector: 15326660

Service Connector: 88986262

Description: 10-Way F 280 GT Series, Sealed (BK)

Connector Part Information

Harness Type: Cutaway Jumper

OEM Connector: 15326661

Service Connector: Service by Harness - See Part Catalog

Description: 10-Way M 280 GT Series, Sealed (BK)

Terminal Part Information

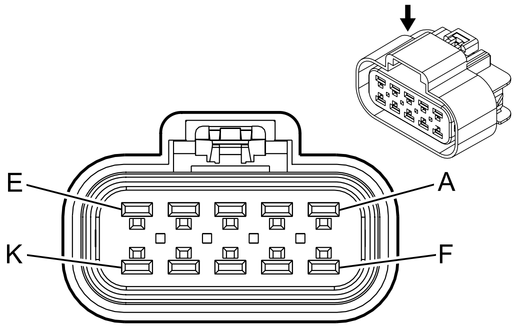
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13576356	J-35616-4A (PU)	J-38125-553	Not Available	Not Available	Not Available	Not Available
II	Not Required	J-35616-5 (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

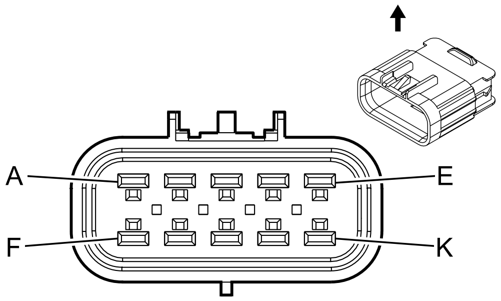
X405 Chassis Harness to Cutaway Jumper Harness (-5H4 Except Cutaway)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A - B	—	—	—	—	—	Not Occupied	A - B	—	—	—	—	—
C	0.8	L-BU	1320	I	—	CHMSL Control	C	1	L-BU	1320	II	—
D	—	—	—	—	—	Left Rear Turn Signal	D	1	YE	618	II	—

D	—					Lamp Control	D	1				
E	—	—	—	—	—	Right Rear Turn Signal Lamp Control	E	1	D-GN	619	II	—
F	—	—	—	—	—	Trailer Park Lamp Control	F	1	BN	2109	II	—
G	0.8	BK	150	I	—	Ground	G	1	L-BU	150	II	—
H	—	—	—	—	—	Trailer Backup Lamp Control	H	1	OG	1624	II	—
J	—	—	—	—	—	Not Occupied	J	—	—	—	—	—
K	—	—	—	—	—	Courtesy Lamp Control	K	0.8	D-BU/WH	149	II	—

X405 Cutaway Jumper Harness to Chassis Harness (5H4 Except Cutaway)





Connector Part Information

Harness Type: Cutaway Jumper

OEM Connector: 15326660

Service Connector: Service by Harness - See Part Catalog

Description: 10-Way F 280 GT Series, Sealed (BK)

Connector Part Information

Harness Type: Chassis

OEM Connector: 15326661

Service Connector: 88986245

Description: 10-Way M 280 GT Series, Sealed (BK)

Terminal Part Information

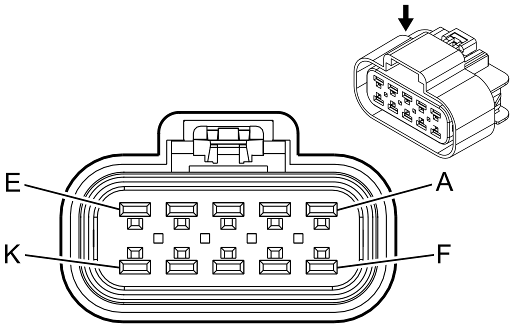
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	13580826	J-35616-5 (PU)	J-38125-553	Not Available	Not Available	Not Available	Not Available

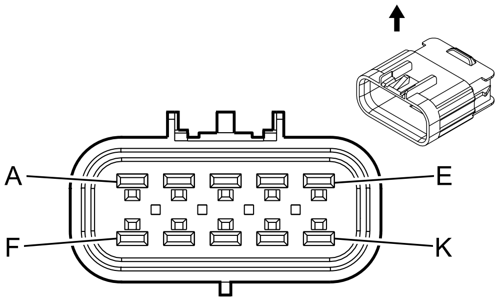
X405 Cutaway Jumper Harness to Chassis Harness (5H4 Except Cutaway)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A - B	—	—	—	—	—	Not Occupied	A - B	—	—	—	—	—
C	1	L-BU	1320	I	—	CHMSL Control	C	0.8	L-BU	1320	II	—
D	1	YE	618	I	—	Left Rear Turn Signal	D	1	YE	618	II	—

D	1					Lamp Control	D	1				
E	1	D-GN	619	I	—	Right Rear Turn Signal Lamp Control	E	1	D-GN	619	II	—
F	1	BN	2109	I	—	Trailer Park Lamp Control	F	1	BN	2109	II	—
G	1	D-BU	150	I	—	Ground	G	1	BK	150	II	—
H	1	WH	1624	I	—	Trailer Backup Lamp Control	H	1	L-GN	1624	II	—
J	—	—	—	—	—	Not Occupied	J	—	—	—	—	—
K	0.8	D-BU/WH	149	I	—	Courtesy Lamp Control	K	0.8	D-BU/WH	149	II	—

X405 Rear Lamp Harness to Rear Lamp Harness (Cutaway)





Connector Part Information

Harness Type: Rear Lamp

OEM Connector: 15326660

Service Connector: Service by Harness - See Part Catalog

Description: 10-Way F 280 GT Series, Sealed (BK)

Connector Part Information

Harness Type: Rear Lamp

OEM Connector: —

Service Connector: Service by Harness - See Part Catalog

Description: 10-Way M

Terminal Part Information

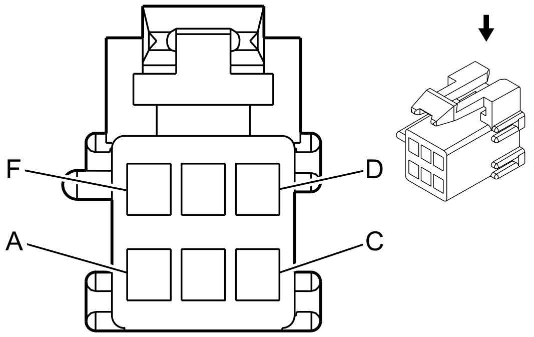
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	Not Available	No Tool Required	Not Required	Not Required	Not Required	Not Required

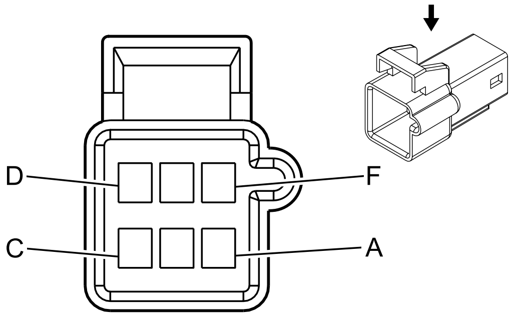
X405 Rear Lamp Harness to Rear Lamp Harness (Cutaway)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
K	—	—	—	—	—	Courtesy Lamp Control	K	0.8	D-BU/WH	149	II	—
F	—	—	—	—	—	Trailer Park Lamp Control	F	1	BN	2109	II	—

E	—	—	—	—	—	Right Rear Turn Signal Lamp Control	E	1	D-GN	619	II	—
D	—	—	—	—	—	Left Rear Turn Signal Lamp Control	D	1	YE	618	II	—
A - B	—	—	—	—	—	Not Occupied	A - B	—	—	—	—	—
C	1	WH	17	I	—	Stop Lamp Switch Signal	C	1	WH	17	II	—
G	1	BK	150	I	—	Ground	G	1	BK	150	II	—
H	1	L-GN	1624	I	—	Trailer Backup Lamp Control	H	1	L-GN	1624	II	—
J	—	—	—	—	—	Not Occupied	J	—	—	—	—	—

X407 Auxiliary HVAC Harness to Body Harness





Connector Part Information

Harness Type: Auxiliary HVAC

OEM Connector: 12064762

Service Connector: Service by Harness - See Part Catalog

Description: 6-Way F 150 Metri-Pack Series (GY)

Connector Part Information

Harness Type: Body

OEM Connector: 12064763

Service Connector: 12101876

Description: 6-Way M 150 Metri-Pack Series (GY)

Terminal Part Information

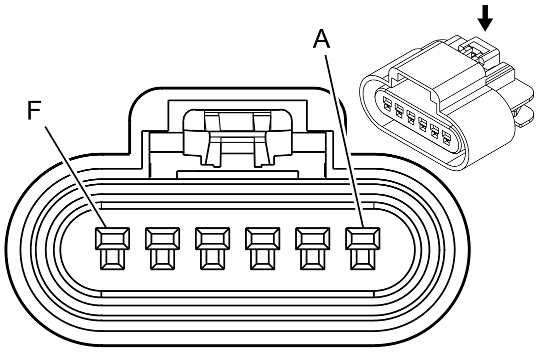
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-3 (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required

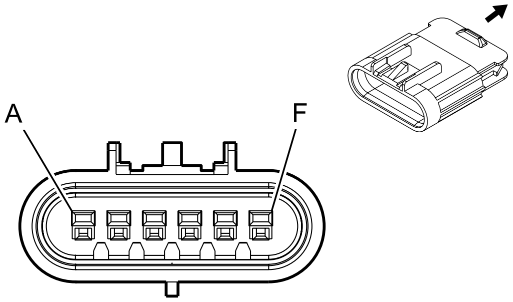
X407 Auxiliary HVAC Harness to Body Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	0.35	OG	2775	I	—	Rear Air Temperature Motor Control	A	0.35	OG	2775	II	—
B	0.35	D-BU	1926	I	—	Auxiliary Blower Motor Low Speed Control	B	0.35	D-BU	1926	II	—

C	0.35	WH	1924	I	—	Auxiliary Blower Motor High Speed Control	C	0.35	WH	1924	II	—
D	0.35	OG	1925	I	—	Auxiliary Blower Motor Medium Speed Control	D	0.35	OG	1925	II	—
E	0.35	BN	341	I	—	Run Ignition 3 Voltage	E	0.35	BN	341	II	—
F	0.35	GY	2599	I	—	Rear Mode Motor Signal	F	0.35	GY	2599	II	—

X408 Rear Fascia Harness to Chassis Harness





Connector Part Information

Harness Type: Rear Fascia

OEM Connector: 15326829

Service Connector: Service by Harness - See Part Catalog

Description: 6-Way F 150 GT Series, Sealed (BK)

Connector Part Information

Harness Type: Chassis

OEM Connector: 15326833

Service Connector: 15326833

Description: 6-Way M 150 GT Series, Sealed (BK)

Terminal Part Information

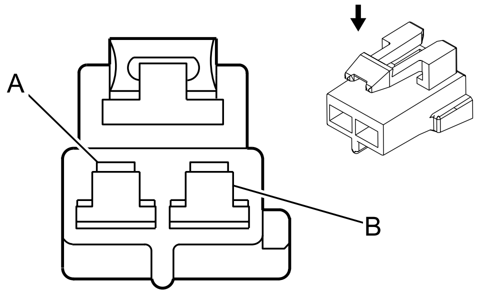
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-3 (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required

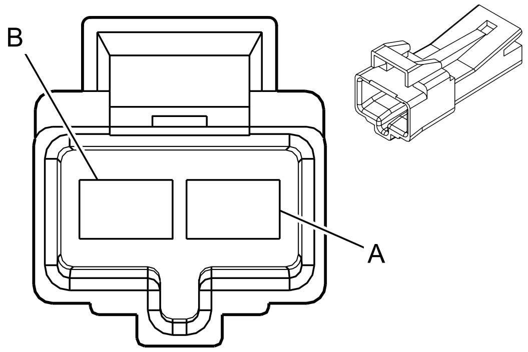
X408 Rear Fascia Harness to Chassis Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	0.5	D-GN	2377	I	—	Right Rear Middle Object Sensor Signal	A	0.5	D-GN	2377	II	—
B	0.5	PU	2378	I	—	Right Rear Corner Object Sensor Signal	B	0.5	PU	2378	II	—

C	0.5	GY	2379	I	—	Object Sensor Low Reference	C	0.5	GY	2379	II	—
D	0.5	D-BU	2374	I	—	Object Sensor Control	D	0.5	D-BU	2374	II	—
E	0.5	YE	2375	I	—	Left Rear Corner Object Sensor Signal	E	0.5	YE	2375	II	—
F	0.5	OG	2376	I	—	Left Rear Middle Object Sensor Signal	F	0.5	OG	2376	II	—

X409 Auxiliary HVAC Harness to Body Harness





Connector Part Information

Harness Type: Auxiliary HVAC

OEM Connector: 12064749

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F 480 Metri-Pack Series (BK)

Connector Part Information

Harness Type: Body

OEM Connector: 12064750

Service Connector: 12101935

Description: 2-Way M 480 Metri-Pack Series (BK)

Terminal Part Information

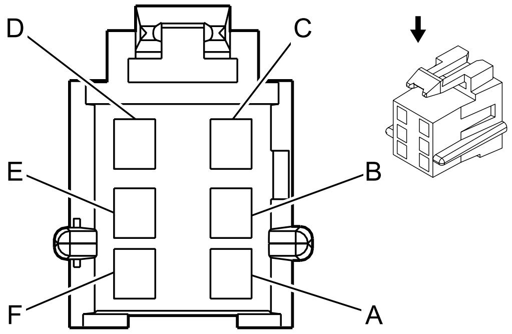
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-40 (BU)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-40 (BU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

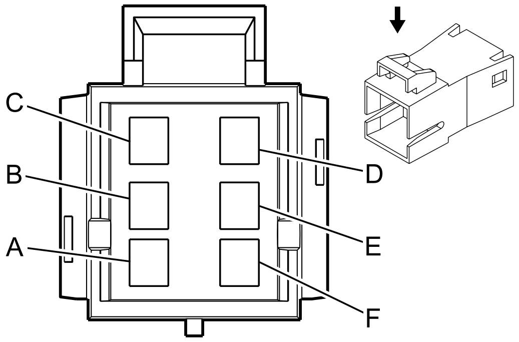
X409 Auxiliary HVAC Harness to Body Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	5	RD/WH	1740	I	—	Battery Positive Voltage	A	5	RD/WH	1740	II	—
B	5	BK	850	I	—	Ground	B	5	BK	450	II	ENC

									BK	850	II	C36/C69
								5				

X410 Left Tail Lamp Assembly Harness to Body Harness (Except Cutaway)





Connector Part Information

Harness Type: Left Tail Lamp Assembly

OEM Connector: —

Service Connector: Service by Harness - See Part Catalog

Description: 6-Way F

Connector Part Information

Harness Type: Body

OEM Connector: 12064754

Service Connector: 15305872

Description: 6-Way M 280 Metri-Pack Series (BK)

Terminal Part Information

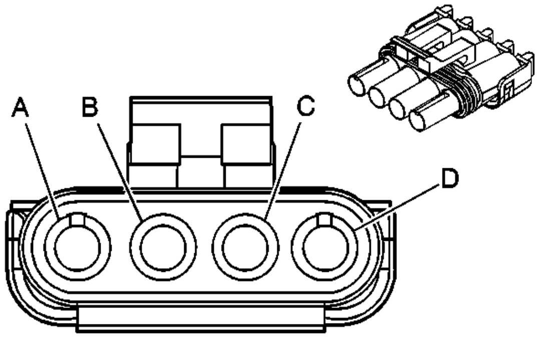
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Available	No Tool Required	Not Available	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-5 (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

X410 Left Tail Lamp Assembly Harness to Body Harness (Except Cutaway)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
F	0.8	L-GN	24	I	—	Backup Lamp Control	F	0.8	L-GN	24	II	—
D	0.8	BK	850	I	—	Ground	D	0.8	BK	850	II	—

B	1	YE	618	I	—	Left Rear Turn Signal Lamp Control	B	1	YE	618	II	—
A	0.5	BN	2509	I	—	Left Rear Park Lamp Control	A	0.5	BN	2509	II	—
C - E	—	—	—	—	—	Not Occupied	C - E	—	—	—	—	—

X410 Rear Lamp Harness to Left Tail Lamp Assembly Harness (Cutaway)



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Connector Part Information

Harness Type: Rear Lamp

OEM Connector: 12015797

Service Connector: Service by Harness - See Part Catalog

Description: 4-Way F Weather Pack Series (BK)

Connector Part Information

Harness Type: Left Tail Lamp Assembly

OEM Connector: —

Service Connector: Service by Harness - See Part Catalog

Description: 4-Way M

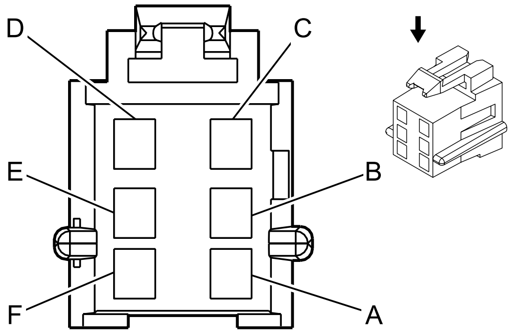
Terminal Part Information

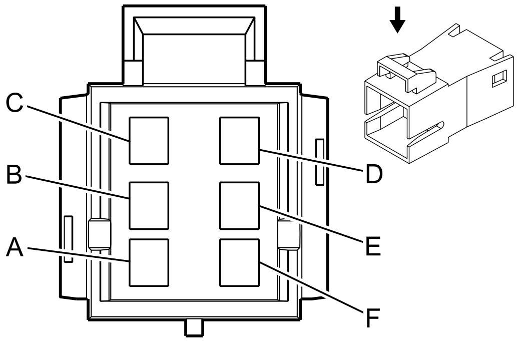
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-8 (OG)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	Not Available	No Tool Required	Not Required	Not Required	Not Required	Not Required

X410 Rear Lamp Harness to Left Tail Lamp Assembly Harness (Cutaway)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	1	YE	618	I	—	Left Rear Turn Signal Lamp Control	A	1	YE	618	II	—
B	1	D-GN	619	I	—	Right Rear Turn Signal Lamp Control	B	1	D-GN	619	II	—
C	1	L-GN	1624	I	—	Trailer Backup Lamp Control	C	1	L-GN	1624	II	—
D	1	BN	2109	I	—	Trailer Park Lamp Control	D	1	BN	2109	II	—

X411 Left Rear Cargo Door Harness to Body Harness





Connector Part Information

Harness Type: Left Rear Cargo Door

OEM Connector: 12064752

Service Connector: Service by Harness - See Part Catalog

Description: 6-Way F 280 Metri-Pack Series (BK)

Connector Part Information

Harness Type: Body

OEM Connector: 12064754

Service Connector: 15305872

Description: 6-Way M 280 Metri-Pack Series (BK)

Terminal Part Information

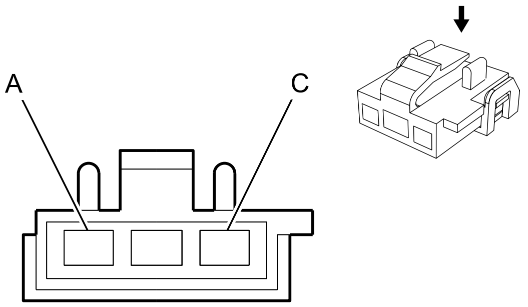
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-5 (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

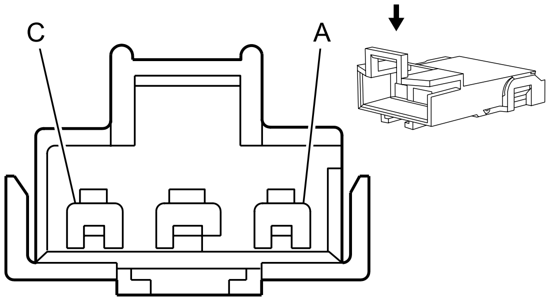
X411 Left Rear Cargo Door Harness to Body Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	1	TN	1859	I	—	Left Rear Midrange Speaker Control (+)	A	1	TN	1859	II	—
B	1	WH	1959	I	—	Left Rear Midrange Speaker (-) Low Reference	B	1	WH	1959	II	—

C	—	—	—	—	—	Not Occupied	C	—	—	—	—	—
D	5	PU	293	I	—	Rear Defog Element Control	D	5	PU	293	II	—
E	3	BK	850	I	—	Ground	E	3	BK	850	II	—
F	—	—	—	—	—	Not Occupied	F	—	—	—	—	—

X412 Right Rear Cargo Door Harness to Body Harness





Connector Part Information

Harness Type: Right Rear Cargo Door

OEM Connector: 12020014

Service Connector: Service by Harness - See Part Catalog

Description: 3-Way F Weather Pack Series (BK)

Connector Part Information

Harness Type: Body

OEM Connector: 12045681

Service Connector: 12102634

Description: 3-Way M 280, 480 Metri-Pack Series (BK)

Terminal Part Information

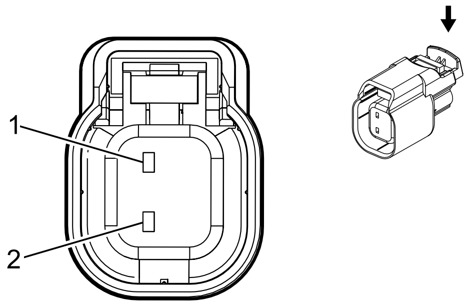
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-40 (BU)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required
III	Not Required	J-35616-40 (BU)	No Tool Required	Not Required	Not Required	Not Required	Not Required
IV	Not Required	J-35616-5 (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

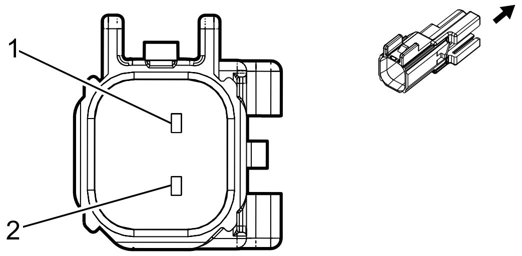
X412 Right Rear Cargo Door Harness to Body Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	0.5	BN	2509	II	—	Left Rear Park Lamp Control	A	0.5	BN	2509	IV	—

B	5	PU	293	I	—	Rear Defog Element Control	B	5	PU	293	III	—
C	3 0.5	BK BK	1050 1050	II II	C49 -C49	Ground Ground	C	3	BK	1050	IV	—

X413 Wheel Speed Sensor Harness to Chassis Harness





Connector Part Information

Harness Type: Wheel Speed Sensor

OEM Connector: 13828712

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F 1.5 Series, Sealed (BK)

Connector Part Information

Harness Type: Chassis

OEM Connector: 13719748

Service Connector: 19301583

Description: 2-Way M 1.5 Series, Sealed (BK)

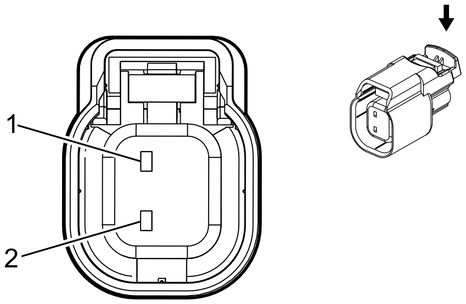
Terminal Part Information

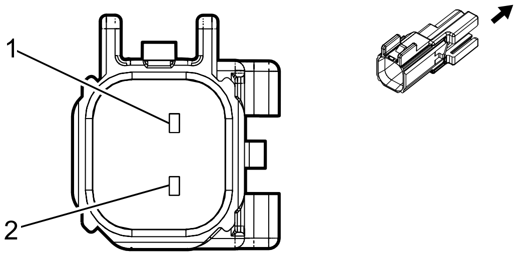
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-2A (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-3 (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required

X413 Wheel Speed Sensor Harness to Chassis Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
1	0.5	BK	884	I	—	Wheel Speed Sensor Signal Left Rear	1	0.5	OG	885	II	—
2	0.5	RD	885	I	—	Wheel Speed Sensor Low Reference Left Rear	2	0.5	TN	884	II	—

X414 Right Rear Wheel Speed Sensor Jumper Harness to Chassis Harness





Connector Part Information

Harness Type: Right Rear Wheel Speed Sensor Jumper

OEM Connector: 13828712

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F 1.5 Series, Sealed (BK)

Connector Part Information

Harness Type: Chassis

OEM Connector: 13719748

Service Connector: 19301583

Description: 2-Way M 1.5 Series, Sealed (BK)

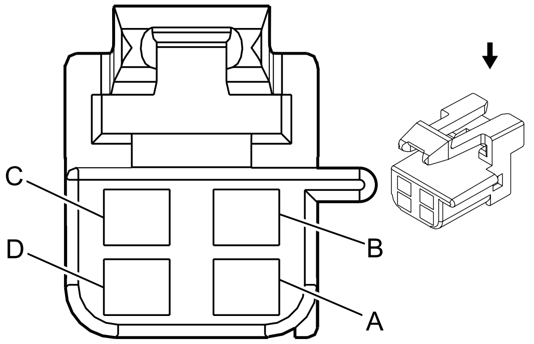
Terminal Part Information

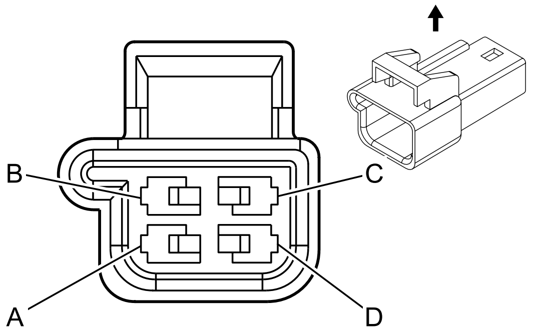
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-2A (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-3 (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required

X414 Right Rear Wheel Speed Sensor Jumper Harness to Chassis Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
1	0.5	BN	882	I	—	Wheel Speed Sensor Signal Right Rear	1	0.5	WH	883	II	—
2	0.5	WH	883	I	—	Wheel Speed Sensor Low Reference Right Rear	2	0.5	BN	882	II	—

X415 Roof Center Speaker Harness to Body Harness





Connector Part Information

Harness Type: Roof Center Speaker

OEM Connector: —

Service Connector: Service by Harness - See Part Catalog

Description: 4-Way F

Connector Part Information

Harness Type: Body

OEM Connector: 12065658

Service Connector: 12085206

Description: 4-Way M 150 Metri-Pack Series (BK)

Terminal Part Information

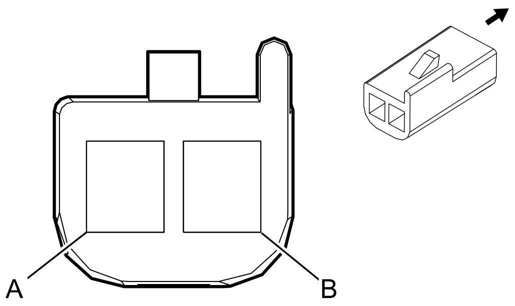
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Available	No Tool Required	Not Available	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-3 (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required

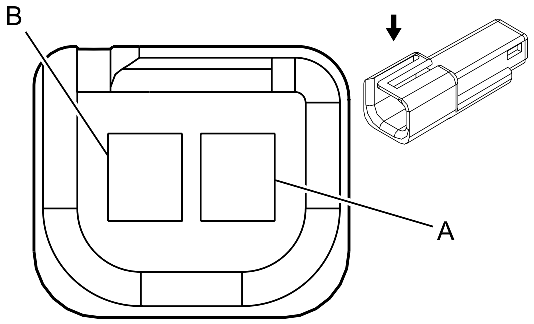
X415 Roof Center Speaker Harness to Body Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
D	1	TN	1855	I	—	Right Rear Midrange Speaker Control (+)	D	1	TN	1855	II	—
C	1	OG	1955	I	—	Right Rear Midrange Speaker (-) Low Reference	C	1	OG	1955	II	—

B	1	TN	1859	I	—	Left Rear Midrange Speaker Control (+)	B	1	TN	1859	II	—
A	1	WH	1959	I	—	Left Rear Midrange Speaker (-) Low Reference	A	1	WH	1959	II	—

X419 Center High Mounted Stop Lamp Harness to Body Harness





Connector Part Information

Harness Type: Center High Mounted Stop Lamp

OEM Connector: —

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F

Connector Part Information

Harness Type: Body

OEM Connector: 12048457

Service Connector: 13584278

Description: 2-Way M 150 Metri-Pack Series (BK)

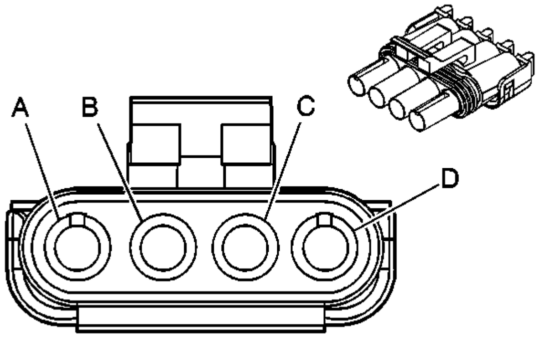
Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Available	No Tool Required	Not Available	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-3 (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required

X419 Center High Mounted Stop Lamp Harness to Body Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
B	0.8	BK	850	I	—	Ground	B	0.8	BK	850	II	—
A	0.8	L-BU	1320	I	—	CHMSL Control	A	0.8	L-BU	1320	II	—

X420 Rear Lamp Harness to Body Harness (Cutaway)



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Connector Part Information

Harness Type: Rear Lamp

OEM Connector: 12015797

Service Connector: Service by Harness - See Part Catalog

Description: 4-Way F Weather Pack Series (BK)

Connector Part Information

Harness Type: Body

OEM Connector: —

Service Connector: Service by Harness - See Part Catalog

Description: 4-Way M

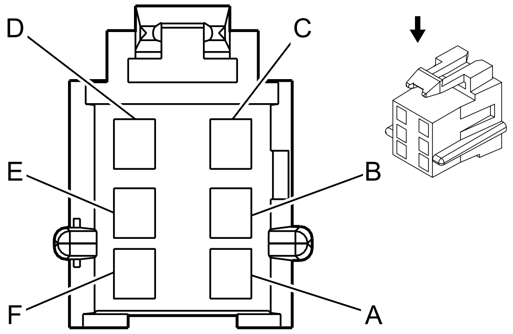
Terminal Part Information

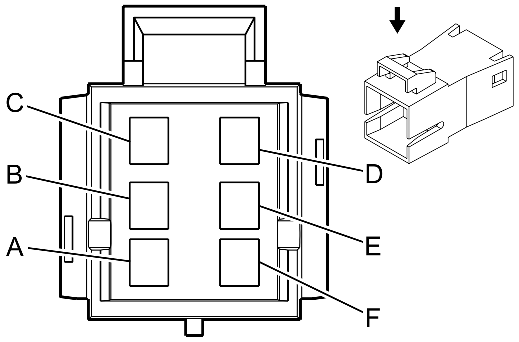
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-8 (OG)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	Not Available	No Tool Required	Not Required	Not Required	Not Required	Not Required

X420 Rear Lamp Harness to Body Harness (Cutaway)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	0.8	D-BU/WH	149	I	—	Courtesy Lamp Control	A	0.8	D-BU/WH	149	II	—
B	1	WH	17	I	—	Stop Lamp Switch Signal	B	1	WH	17	II	—
C	1	BN	2109	I	—	Trailer Park Lamp Control	C	1	BN	2109	II	—
D	1	BK	150	I	—	Ground	D	1	BK	150	II	—

X420 Right Tail Lamp Assembly Harness to Body Harness (Except Cutaway)





Connector Part Information

Harness Type: Right Tail Lamp Assembly

OEM Connector: —

Service Connector: Service by Harness - See Part Catalog

Description: 6-Way F

Connector Part Information

Harness Type: Body

OEM Connector: 12064754

Service Connector: 15305872

Description: 6-Way M 280 Metri-Pack Series (BK)

Terminal Part Information

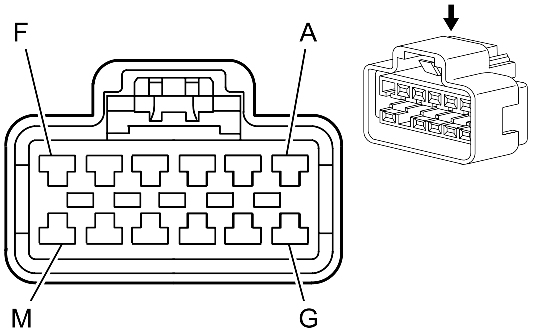
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Available	No Tool Required	Not Available	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-5 (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

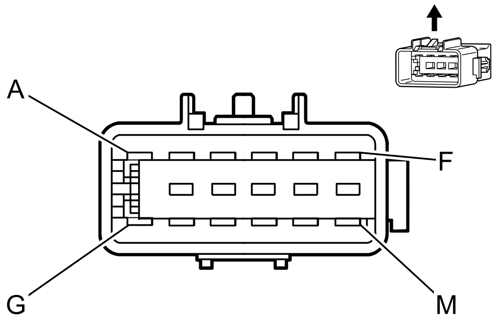
X420 Right Tail Lamp Assembly Harness to Body Harness (Except Cutaway)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
F	0.8	L-GN	24	I	—	Backup Lamp Control	F	0.8	L-GN	24	II	—
D	0.8	BK	1050	I	—	Ground	D	0.8	BK	1050	II	—

B	1	D-GN	619	I	—	Right Rear Turn Signal Lamp Control	B	1	D-GN	619	II	—
A	0.5	BN	2609	I	—	Right Rear Park Lamp Control Right Rear Park Lamp Control	A	0.5	BN	2609	II	—
A	0.5	BN	2609	I	—	Right Rear Park Lamp Control Right Rear Park Lamp Control	A	0.5	BN	2609	II	—
C - E	—	—	—	—	—	Not Occupied	C - E	—	—	—	—	—

X421 Body Harness to Body Harness (Cargo)





Connector Part Information

Harness Type: Body

OEM Connector: —

Service Connector: Service by Harness - See Part Catalog

Description: 12-Way F

Connector Part Information

Harness Type: Body

OEM Connector: 15326942

Service Connector: 15326942

Description: 12-Way M 280 GT Series (BK)

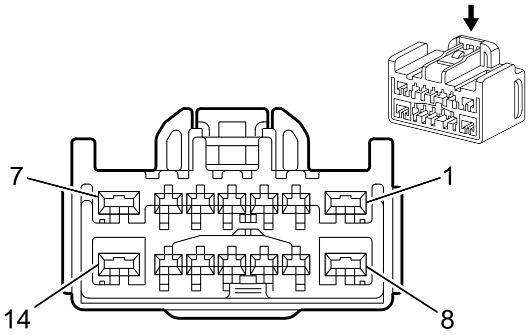
Terminal Part Information

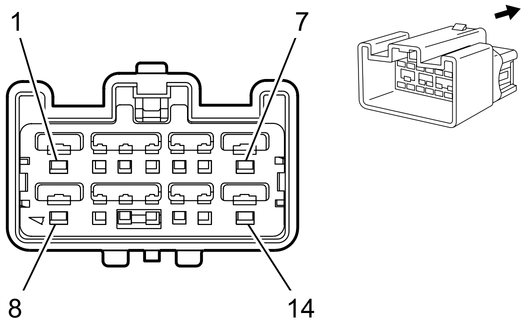
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Available	No Tool Required	Not Available	Not Required	Not Required	Not Required	Not Required
II	13575505	J-35616-5 (PU)	J-38125-553	15304722	Delphi 8	E	C
III	13575507	J-35616-5 (PU)	J-38125-553	15304724	Delphi 8	2	A

X421 Body Harness to Body Harness (Cargo)

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
M	0.5	PK/BK	5265	I	—	Dual Logic Module Rear Control Signal	M	0.5	PK/BK	5265	II	—
L	0.5	PU/WH	5264	I	—	Dual Logic Module Rear	L	0.5	PU/WH	5264	II	—

L	0.5					Mode Signal	L	0.5				
K	0.5	BN	5263	I	—	Dual Logic Module Rear Temperature Signal	K	0.5	BN	5263	II	—
J	0.8	OG	1732	I	—	Electronic Control Unit 12V Reference 3	J	0.8	OG	1732	III	—
H	0.8	BK	1050	I	—	Ground	H	0.8	BK	1050	III	—
G	0.35	BN	341	I	—	Run Ignition 3 Voltage	G	0.35	BN	341	II	—
F	0.5	D-BU	1926	I	—	Auxiliary Blower Motor Low Speed Control	F	0.5	D-BU	1926	II	—
E	0.5	OG	1925	I	—	Auxiliary Blower Motor Medium Speed Control	E	0.5	OG	1925	II	—
D	0.5	WH	1924	I	—	Auxiliary Blower Motor High Speed Control	D	0.5	WH	1924	II	—
C	0.35	BN/WH	230	I	—	Instrument Panel Lamp Dimming Control	C	0.35	BN/WH	230	II	—
B	0.8	D-BU/WH	149	I	—	Courtesy Lamp Control	B	0.8	D-BU/WH	149	III	—
A	0.8	D-BU/WH	149	I	—	Courtesy Lamp Control	A	0.8	D-BU/WH	149	III	—





Connector Part Information

Harness Type: Body

OEM Connector: 10847017

Service Connector: 88956524

Description: 14-Way F 1.5, 2.8 Series (L-GY)

Connector Part Information

Harness Type: Headliner Rear Extension

OEM Connector: 10846900

Service Connector: Service by Harness - See Part Catalog

Description: 14-Way M 1.5, 2.8 Series (L-GY)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	13575832	J-35616-35 (VT)	J-38125-11A	7116-4112-02	Yazaki 9	C	D
II	13575838	J-35616-35 (VT)	J-38125-11A	7116-4111-02	Yazaki 9	E	A
III	13575850	J-35616-2A (GY)	J-38125-11A	Not Available	Not Available	Not Available	Not Available
IV	Not Required	J-35616-3 (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required
V	Not Required	J-35616-5 (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

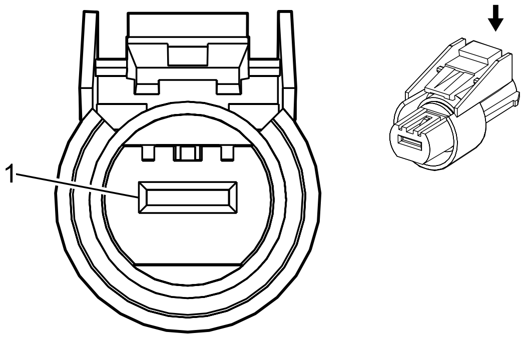
X421 Body Harness to Headliner Rear Extension Harness (Passenger)

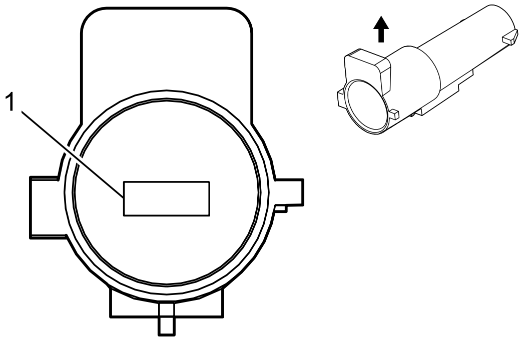
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
1	0.8	D-BU/WH	149	II	—	Courtesy Lamp Control	1	0.8	D-BU/WH	149	V	—

2	0.35	BN/WH	230	III	—	Instrument Panel Lamp Dimming Control	2	0.35	BN/WH	230	IV	—
3	0.5	WH	1924	III	—	Auxiliary Blower Motor High Speed Control	3	0.5	WH	1924	IV	—
4	0.5	OG	1925	III	—	Auxiliary Blower Motor Medium Speed Control	4	0.5	OG	1925	IV	—
5	0.5	D-BU	1926	III	—	Auxiliary Blower Motor Low Speed Control	5	0.5	D-BU	1926	IV	—
6	0.35	BN	341	III	—	Run Ignition 3 Voltage	6	0.35	BN	341	IV	—
7	3	BN	541	I	—	Run Ignition 3 Voltage	7	2	BN	541	V	—
8	0.8	D-BU/WH	149	II	—	Courtesy Lamp Control	8	0.8	D-BU/WH	149	V	—
9	0.5	BN	5263	III	—	Dual Logic Module Rear Temperature Signal	9	0.5	BN	5263	IV	—
10	0.8	OG	1732	III	—	Electronic Control Unit 12V Reference 3	10	0.8	OG	1732	IV	—
11	0.5	PU/WH	5264	III	—	Dual Logic Module Rear Mode Signal	11	0.5	PU/WH	5264	IV	—
12	0.5	PK/BK	5265	III	—	Dual Logic Module Rear Control Signal	12	0.5	PK/BK	5265	IV	—

13	0.8	BK	1050	III	—	Ground	13	0.8	BK	1050	IV	—
14	3	BK	1050	I	—	Ground	14	2	BK	1050	V	—

X460 Chassis Harness to Trailer Provision Harness





Connector Part Information

Harness Type: Chassis

OEM Connector: 15326120

Service Connector: 15326120

Description: 1-Way F 800 Metri-Pack Series, Sealed (BK)

Connector Part Information

Harness Type: Chassis

OEM Connector: 15326119

Service Connector: 89046877

Description: 1-Way M 800 Metri-Pack Series, Sealed (BK)

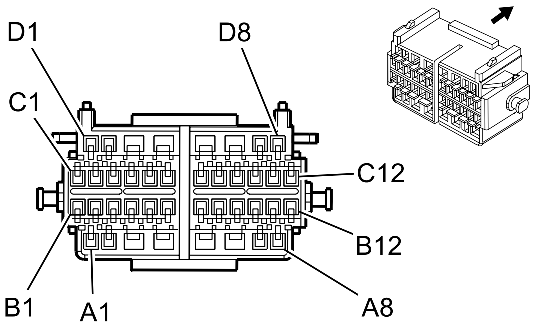
Terminal Part Information

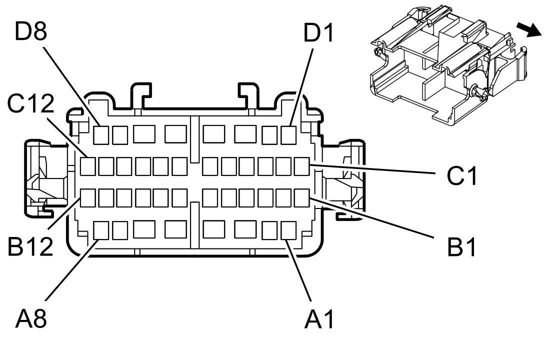
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-44 (YE)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-45 (YE)	No Tool Required	Not Required	Not Required	Not Required	Not Required

X460 Chassis Harness to Trailer Provision Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
1	8	WH	22	I	—	Trailer Ground	1	8	WH	22	II	—

X500 Driver Door Harness to Body Harness





Connector Part Information

Harness Type: Driver Door

OEM Connector: 15448129

Service Connector: Service by Harness - See Part Catalog

Description: 40-Way F 150, 280 GT Series (BK)

Connector Part Information

Harness Type: Body

OEM Connector: 15416976

Service Connector: 89047197

Description: 40-Way M 150, 280 GT Series (BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required
III	13575502	J-35616-3 (GY)	J-38125-553	15304702	Delphi 19	E	4
IV	13575502	J-35616-3 (GY)	J-38125-553	15304702	Delphi 19	E	C
V	13575505	J-35616-5 (PU)	J-38125-553	15304722	Delphi 8	E	C
VI	13575510	J-35616-5 (PU)	J-38125-553	15304724	Delphi 8	A	D
VII	19177683	J-35616-3 (GY)	J-38125-553	15304702	Delphi 19	2	4

X500 Driver Door Harness to Body Harness

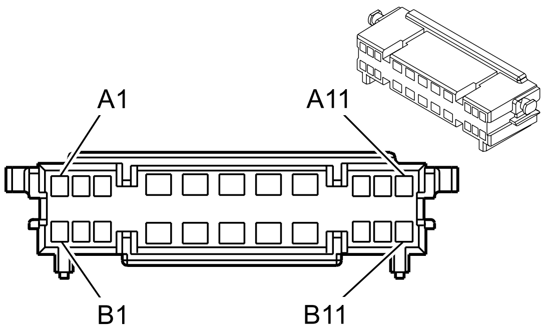
Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option

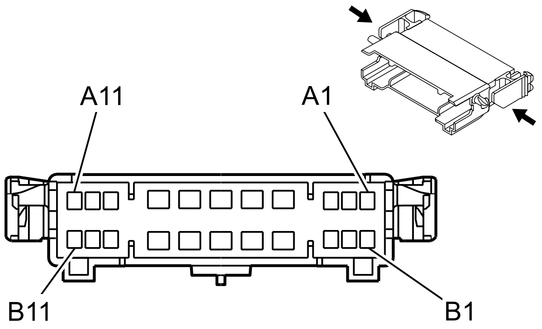
A1	0.35	TN	126	I	—	Left Front Door Open Switch Signal	A1	0.35	TN	126	IV	—
A2 - A4	—	—	—	—	—	Not Occupied	A2 - A4	—	—	—	—	—
A5	3	BK	450	II	—	Ground	A5	3	BK	450	VI	—
A6	0.35	BN/WH	230	II	—	Instrument Panel Lamp Dimming Control	A6	0.35	BN/WH	230	V	—
A7	0.8	OG	2267	I	—	Mirror Heating Element Control	A7	0.8	OG	2267	VII	—
A8	0.35	PU/WH	889	I	—	Right Mirror Motor Down Control	A8	0.5	PU/WH	889	III	—
B1	0.35	OG/BK	781	I	—	Driver Door Lock Switch Unlock Signal	B1	0.35	OG/BK	781	IV	—
B2	0.35	PK/BK	780	I	—	Driver Door Lock Switch Lock Signal	B2	0.35	PK/BK	780	IV	—
B3	0.35	GY/BK	745	I	—	Left Front Door Ajar Switch Signal	B3	0.35	GY/BK	745	IV	—
B4	0.35	BK	450	I	—	Ground	B4	0.35	BK	450	IV	—
B5 - B6	—	—	—	—	—	Not Occupied	B5 - B6	—	—	—	—	—
B7	0.8	TN	694	I	—	Driver Door Lock Actuator Unlock Control	B7	0.8	TN	694	VII	—
		GY	295	I	—	Door Lock Actuator			GY	295	VII	—

B8	0.8					Lock Control	B8	0.8				
B9 - B11	—	—	—	—	—	Not Occupied	B9 - B11	—	—	—	—	—
B12	0.8	D-BU	1857	I	—	Left Front Midrange Speaker Control (+)	B12	0.8	D-BU	1857	VII	—
C1	0.5	PU/WH	6628	I	—	Left Front Side Impact Sensing Module Low Reference	C1	0.5	PU/WH	6628	III	—
C2	0.5	WH	2132	I	—	Left Front Side Impact Sensing Module Signal	C2	0.5	WH	2132	III	—
C3 - C6	—	—	—	—	—	Not Occupied	C3 - C6	—	—	—	—	—
C7	0.5	L-BU/WH	1314	I	—	Left Front Turn Signal Lamp Control	C7	0.5	L-BU/WH	1314	III	—
C8	0.5	RD/WH	4340	I	—	Battery Positive Voltage	C8	0.5	RD/WH	4340	III	—
C9 - C11	—	—	—	—	—	Not Occupied	C9 - C11	—	—	—	—	—
C12	0.8	L-BU	1957	I	—	Left Front Midrange Speaker (-) Low Reference	C12	0.8	L-BU	1957	VII	—
D1 - D3	—	—	—	—	—	Not Occupied	D1 - D3	—	—	—	—	—
D4	3	TN	167	II	—	Power Window Master Switch Right Front Down Signal	D4	3	TN	167	VI	—
D5	3	L-BU	166	II	—	Power Window Master Switch Right Front Up Signal	D5	3	L-BU	166	VI	—
D6	3	D-GN	1001	II	—	Retained Accessory Power Ignition	D6	3	D-GN	1001	VI	—

D7	0.35	BN/WH	1498	I	—	Right Mirror Motor Up Control	D7	0.5	BN/WH	1498	III	—
D8	0.35	OG/WH	881	I	—	Right Mirror Motor Right Control	D8	0.5	OG/WH	881	III	—

X600 Passenger Door Harness to Body Harness





Connector Part Information

Harness Type: Passenger Door

OEM Connector: 15326063

Service Connector: Service by Harness - See Part Catalog

Description: 22-Way F 150, 280 GT Series (GY)

Connector Part Information

Harness Type: Body

OEM Connector: 15326064

Service Connector: 15326064

Description: 22-Way M 150, 280 GT Series (GY)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-14 (GN)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-4A (PU)	No Tool Required	Not Required	Not Required	Not Required	Not Required
III	13575502	J-35616-3 (GY)	J-38125-553	15304702	Delphi 19	E	4
IV	13575502	J-35616-3 (GY)	J-38125-553	15304702	Delphi 19	E	C
V	13575505	J-35616-5 (PU)	J-38125-553	15304722	Delphi 8	E	C
VI	13575507	J-35616-5 (PU)	J-38125-553	15304724	Delphi 8	2	A
VII	13575510	J-35616-5 (PU)	J-38125-553	15304724	Delphi 8	A	D
VIII	19177683	J-35616-3 (GY)	J-38125-553	15304702	Delphi 19	2	4

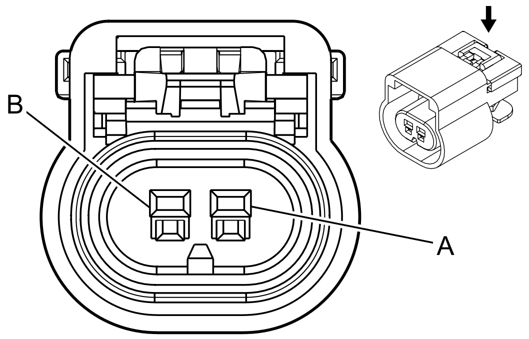
X600 Passenger Door Harness to Body Harness

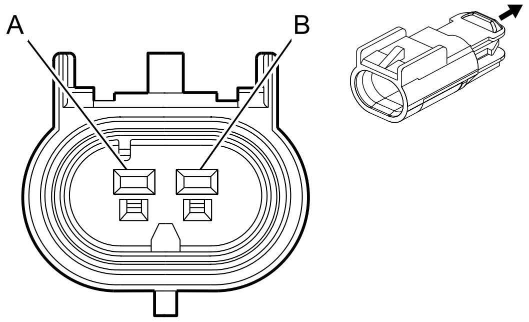
Pin	Size	Color	Circuit	Terminal Type	Option	Function	Pin	Size	Color	Circuit	Terminal Type	Option

				ID							ID	
A1	0.8	OG	1853	I	—	Right Front Midrange Speaker Control (+)	A1	0.8	OG	1853	VIII	—
A2	0.8	TN	294	I	—	Door Lock Actuator Unlock Control	A2	0.8	TN	294	VIII	—
A3	0.8	OG	2267	I	—	Mirror Heating Element Control	A3	0.8	OG	2267	VIII	—
A4	3	L-BU	166	II	—	Power Window Master Switch Right Front Up Signal	A4	3	L-BU	166	VII	—
A5	0.8	BK	1850	II	—	Ground	A5	0.8	BK	1850	VI	—
A6	0.35	BN/WH	1498	II	—	Right Mirror Motor Up Control	A6	0.5	BN/WH	1498	V	—
A7	0.35	OG/WH	881	II	—	Right Mirror Motor Right Control	A7	0.5	OG/WH	881	V	—
A8	0.35	TN/WH	746	II	—	Right Front Door Ajar Switch Signal	A8	0.35	TN/WH	746	V	—
A9	0.35	BK	1850	I	—	Ground	A9	0.35	BK	1850	IV	—
A10	0.5	D-GN	2134	I	—	Right Front Side Impact Sensing Module Signal	A10	0.5	D-GN	2134	III	—
A11	0.35	L-BU	244	I	—	Passenger Door Lock Switch Lock Control	A11	0.35	L-BU	244	IV	—

B1	0.8	D-GN	1953	I	—	Right Front Midrange Speaker (-) Low Reference	B1	0.8	D-GN	1953	VIII	—
B2	0.8	GY	295	I	—	Door Lock Actuator Lock Control	B2	0.8	GY	295	VIII	—
B3	0.5	D-BU/WH	1315	I	—	Right Front Turn Signal Lamp Control	B3	0.5	D-BU/WH	1315	III	—
B4	3	TN	167	II	—	Power Window Master Switch Right Front Down Signal	B4	3	TN	167	VII	—
B5	3	D-GN	1001	II	—	Retained Accessory Power Ignition	B5	3	D-GN	1001	VII	—
B6	0.35	BN/WH	230	II	—	Instrument Panel Lamp Dimming Control	B6	0.35	BN/WH	230	V	—
B7	0.35	PU/WH	889	II	—	Right Mirror Motor Down Control	B7	0.5	PU/WH	889	V	—
B8	0.35	L-GN	1177	II	—	Right Front Door Open Switch Signal	B8	0.35	L-GN	1177	V	—
B9	—	—	—	—	—	Not Occupied	B9	—	—	—	—	—
B10	0.5	WH/BK	6629	I	—	Right Front Side Impact Sensing Module Low Reference	B10	0.5	WH/BK	6629	III	—
B11	0.35	D-BU	245	I	—	Passenger Door Lock Switch Unlock Control	B11	0.35	D-BU	245	IV	—

X601 Passenger Side Impact Sensor Jumper Harness to Passenger Door Harness





Connector Part Information

Harness Type: Passenger Side Impact Sensor Jumper

OEM Connector: —

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F

Connector Part Information

Harness Type: Passenger Door

OEM Connector: 13510099

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way M 150 GT Series, Sealed (BK)

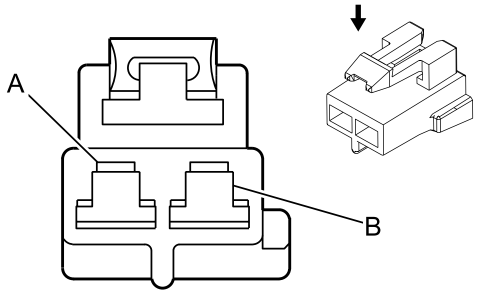
Terminal Part Information

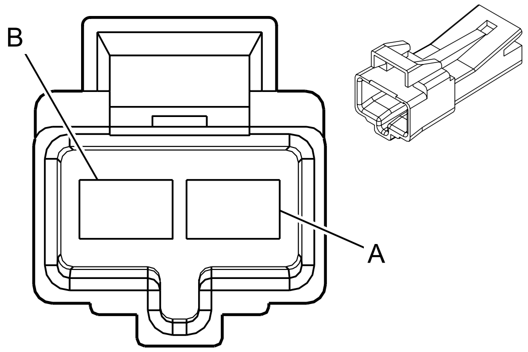
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Available	No Tool Required	Not Available	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-3 (GY)	No Tool Required	Not Required	Not Required	Not Required	Not Required

X601 Passenger Side Impact Sensor Jumper Harness to Passenger Door Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
B	0.5	D-GN	2134	I	—	Right Front Side Impact Sensing Module Signal	B	0.5	D-GN	2134	II	—
A	0.5	WH/BK	6629	I	—	Right Front Side Impact Sensing Module Low Reference	A	0.5	WH/BK	6629	II	—

X901 Rear Window Defogger Jumper Harness to Left Rear Cargo Door Harness





Connector Part Information

Harness Type: Rear Window Defogger Jumper

OEM Connector: 12064749

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F 480 Metri-Pack Series (BK)

Connector Part Information

Harness Type: Left Rear Cargo Door

OEM Connector: 12064750

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way M 480 Metri-Pack Series (BK)

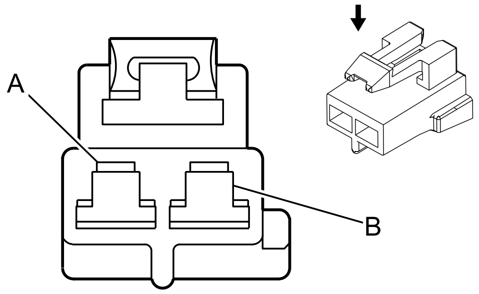
Terminal Part Information

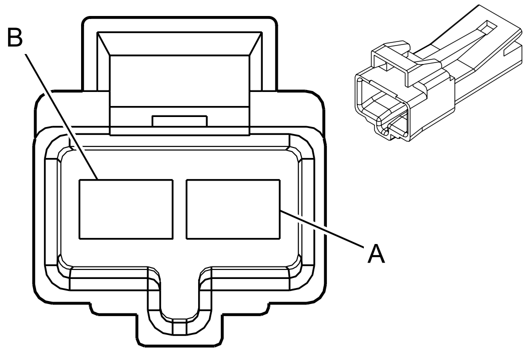
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	J-35616-40 (BU)	No Tool Required	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-40 (BU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

X901 Rear Window Defogger Jumper Harness to Left Rear Cargo Door Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
A	5	PU	293	I	—	Rear Defog Element Control	A	5	PU	293	II	—
B	3	BK	850	I	—	Ground	B	3	BK	850	II	—

X902 Rear Window Defogger Jumper Harness to Right Rear Cargo Door Harness





Connector Part Information

Harness Type: Rear Window Defogger Jumper

OEM Connector: —

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way F

Connector Part Information

Harness Type: Right Rear Cargo Door

OEM Connector: 12064750

Service Connector: Service by Harness - See Part Catalog

Description: 2-Way M 480 Metri-Pack Series (BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Available	No Tool Required	Not Available	Not Required	Not Required	Not Required	Not Required
II	Not Required	J-35616-40 (BU)	No Tool Required	Not Required	Not Required	Not Required	Not Required

X902 Rear Window Defogger Jumper Harness to Right Rear Cargo Door Harness

Pin	Size	Color	Circuit	Terminal Type ID	Option	Function	Pin	Size	Color	Circuit	Terminal Type ID	Option
B	3	BK	1050	I	—	Ground	B	3	BK	1050	II	—
A	5	PU	293	I	—	Rear Defog Element Control	A	5	PU	293	II	—

Description and Operation

Power Mode Description and Operation

Serial Data Power Mode Master

Power to many of this vehicles circuits is controlled by the module that is designated the power mode master (PMM). This vehicles PMM is the body control module (BCM). The BCM has multiple B+ circuits that feed into it. Each of those circuits are partitioned within the controller to drive certain outputs of the vehicle's body functions. An open or short in any one of the B+ circuits may induce multiple codes/or a section of non-functionality within the BCM with the rest of the BCM functioning normally. In this case it is usefull to refer to the power distribution schematics to determine if the non-functional partition of the controller shares a common B+ circuit. The ignition switch is a low current switch with multiple discrete ignition switch signals to the PMM for determination of the power mode that will be sent over the serial data circuits to the other modules that need this information. The PMM will also activate relays and other direct outputs of the PMM as needed. The PMM determines which power mode (Off, Accessory, Run, Crank Request) is required, and reports this information to other modules via serial data. Modules which have switched voltage inputs may operate in a default mode if the PMM serial data message does not match what the individual module can see from its own connections.

The PMM receives ignition switch signals to identify the operators desired power mode. The PMM Power Mode Parameters table below illustrates the correct state of these input parameters (circuits) in correspondence to the ignition switch position:

PMM Power Mode Parameters

Ignition Switch Position	Power Mode Transmitted	Ign. Off / Run / Crank (Run Crank Ignition 1 Voltage Circuit)	Ignition Accessory / Run (Accessory Voltage Circuit)	Ignition Run / Crank (Ignition 1 Voltage Circuit)
Off Key Out	Off	Key Out/ACC	Inactive	Inactive
Off Key IN	Off	Key In/Off	Inactive	Inactive
Accessory	Accessory	Key Out/ACC	Active	Inactive
Run	Run	Run	Active	Active
Start	Crank Request	Crank	Inactive	Active

Relay Controlled Power Mode

The body control module (BCM) uses the discrete ignition switch inputs Run/Crank Ignition 1 Voltage, Accessory Voltage, and Ignition 1 Voltage, to distinguish the correct power mode. The BCM, after determining the desired power mode, will activate the appropriate relays for that power mode.

The RAP relay remains on for a timed period after the Ignition key is removed. Refer to Retained Accessory Power Description and Operation for more information on the retained accessory power (RAP) function.

BCM Awake/Sleep States

The body control module (BCM) is able to control or perform all of the BCM functions in the awake state. The BCM enters the sleep state when active control or normal monitoring of system functions has stopped and a time limit has passed. The BCM must detect certain wake-up inputs before entering the awake state. The BCM monitors for these inputs during the sleep state.

The BCM will enter the awake state if any of the following wake-up inputs are detected:

- Activity on the serial data line
- Detection of a battery reconnect
- Any door open signal
- Headlamps ON
- Key-in-ignition
- Ignition ON
- Park lamps ON
- Keyless entry or remote start message

The BCM will enter a sleep state when all of the following conditions exist:

- The ignition switch is OFF, key out.
- No activity exists on the serial data line.
- No outputs are commanded.
- No delay timers are actively counting.
- No wake-up inputs are present.

If all these conditions are met, the BCM will enter a low power or sleep condition.

Retained Accessory Power Description and Operation

Retained Accessory Power (RAP)

The retained accessory power (RAP) system allows specific vehicle functions to operate for a specific amount of time after the ignition switch is turned OFF. The BCM monitors the ignition switch position, battery condition, and each door ajar/open switch status to determine whether RAP should be initiated or terminated. RAP is controlled with 2 different methods; serial data and relay control. Some modules receive a RAP message over the serial data circuits. Serial data controlled RAP is deactivated as required by their modules RAP power mode operation. Other subsystems are activated directly by the BCM through a RAP relay. Components and systems that are active in RAP are also activated anytime the ignition is any position other than OFF regardless of the door switch signals. The RAP relay is located in the body fuse block, is grounded at G302, and is controlled by the rap relay coil control circuit from the BCM.

Relay Controlled RAP

The BCM keeps the RAP relay energized during all power modes, except Off-Awake and Crank. The relay is also energized for approximately 10 minutes after shutting the ignition OFF and removing the key, providing no door is opened.

Relay controlled RAP will end when one of the following conditions is met:

- The BCM receives an input from any door ajar switch indicating the opening of any door after the ignition key is out of the ignition.

Important: If the BCM is receiving any door ajar signal from those switches when the ignition key is turned OFF, RAP will not initiate.

- The BCM internal timer for the RAP expires after approximately 10 minutes.
- The BCM detects a decrease in battery capacity below a prescribed limit.

The power window system is powered by the RAP relay during the retained accessory power (RAP) power mode.

Serial Data Controlled RAP

RAP systems controlled by serial data are as follows:

Radio

Radio RAP activation/termination is the same as relay operation with 1 exception; the only door switch that will turn off the radio during RAP is the driver door open switch.

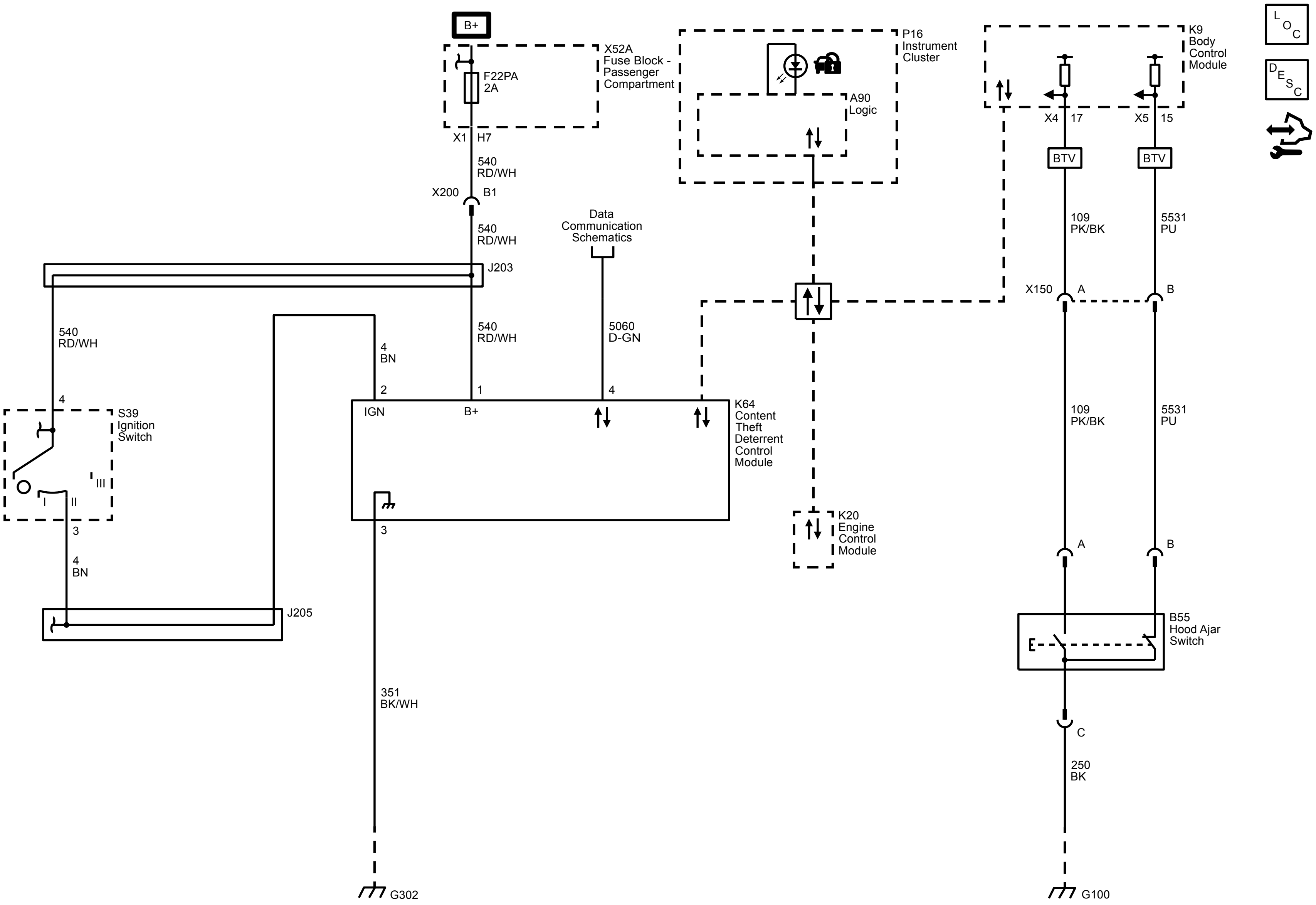
Safety and Security

Immobilizer

Schematic and Routing Diagrams

Immobilizer Schematics

Immobilizer


B+
X52A
Fuse Block -
Passenger
Compartment
F22PA
2A
X1
H7
540
RD/WH
X200
B1
540
RD/WH
J203
540
RD/WH
540
RD/WH
4
S39
Ignition
Switch
I
II
III
3
4
BN
J205
4
BN
2
1
IGN
B+
3
351
BK/WH
G302
Data
Communication
Schematics
5060
D-GN
4
K64
Content
Theft
Deterrent
Control
Module
P16
Instrument
Cluster
A90
Logic
K20
Engine
Control
Module
K9
Body
Control
Module
X4
17
X5
15
BTV
BTV
109
PK/BK
5531
PU
X150
A
B
109
PK/BK
5531
PU
A
B
B55
Hood Ajar
Switch
C
250
BK
G100
L O C
D E S C

Description and Operation

Immobilizer Description and Operation

The immobilizer system functions are provided by the theft deterrent module (TDM) and the engine control module (ECM). When an ignition key is inserted into the ignition lock cylinder and the ignition is switched ON, the transponder embedded in the head of the key is energized by the exciter coil surrounding the ignition lock cylinder. This exciter coil is part of the TDM. The energized transponder transmits a signal that contains its unique value, which is received by the TDM. The TDM then compares this value to a value stored in memory. If the values match, the TDM will send the prerelease password via the serial data circuit to the ECM. If the transponders unique value is incorrect, the TDM will send the fuel disable password to the ECM.

When the ECM receives the TDM prerelease password, the ECM will challenge the password. The ECM sends this challenge back to the TDM via the serial data circuit. Both the ECM and TDM perform a calculation on this challenge. If the calculated response from the TDM equals the calculation performed by the ECM, the ECM will allow vehicle starting.

The components of the theft system are as follows:

- TDM
- ECM
- Ignition key (Transponder)
- Security indicator

Theft Deterrent Module (TDM)

Vehicles with steering column mounted ignition switches have the exciter integral with the theft deterrent module (TDM), which is located within the steering column. The TDM can learn up to 10 keys (transponder values).

The TDM uses the following inputs:

- Battery voltage
- Ignition switched voltage
- Ground circuit

The theft deterrent control module uses the following outputs:

- Password exchange
- Challenge/response with the engine control module (ECM)

When an ignition key is inserted into the ignition lock cylinder and the ignition is switched ON, the transponder embedded in the head of the key is energized by the exciter coils surrounding the ignition lock cylinder. The energized transponder transmits a signal that contains its unique value, which is received by the TDM. The TDM then compares this value to the learned key code stored in memory. The TDM then performs one of the following functions:

- If the transponder value matches the values stored in the TDM memory, the TDM will send the prerelease password to the ECM via the serial data circuit.
- If the transponders unique value does not match the value stored in the TDM, the TDM will send the fuel disable message to the ECM via the serial data circuit.
- If the TDM is unable to measure the ignition key transponder value, the TDM will not send any messages to the ECM.

Engine Control Module (ECM)

When the engine control module (ECM) receives the theft deterrent module (TDM) prerelease password, the ECM will challenge the password. The ECM sends this challenge back to the TDM via the serial data circuit. Both the ECM and TDM perform a calculation on this challenge. If the calculated response from the TDM equals the calculation performed by the ECM, the ECM will allow vehicle starting.

The ECM will disable vehicle starting if any of the following conditions occur:

- The prerelease password is invalid.
- The fuel disable password is sent by the TDM.
- No passwords are received. There is no communication with the TDM.
- The TDM calculated response to the challenge does not equal the calculation performed by the ECM.

The Ignition Key (Transponder)

Note: The ignition key will be stamped with a + or a + surrounded by a circle. This symbol only identifies the key as a PassKey III+ transponder key and is not a reliable way to determine if a particular key is the correct key for a vehicle. Service parts may have a different stamped symbol than the production part. The only way to determine the proper key for a vehicle is by referencing the parts catalog.

The ignition key for PassKey III+ (PK3+) equipped vehicles is a standard ignition key with a transponder located in the plastic head of the key. The transponder value is fixed and unable to be changed. The immobilizer system uses the ignition key transponder value to determine if a valid ignition key is being used to start the vehicle. There are approximately 3 trillion possible transponder values. There are no visible electrical contacts. The immobilizer system use the following types of ignition keys:

Master Keys

Master keys have a black plastic head for full access operation of the vehicle. Master keys may perform the following functions:

- Start the vehicle.
- Lock/unlock all of the door locks and rear compartment.
- Lock/unlock all of the storage compartments.

Valet Keys

Important: Valet keys are NOT standard equipment on all GM vehicle lines.

Valet keys have a gray plastic head and are for restricted operation of the vehicle. Valet keys may perform the following functions:

- Start the vehicle.
- Lock/unlock all of the door locks.

Fleet Keys

Important: Fleet keys are NOT standard equipment on all GM vehicle lines.

Fleets keys allow full access to the vehicle just as a master key would. However, unlike a master key which may only learn 10 keys to a particular vehicle, an unlimited number of fleet keys may be learned to the vehicle. Fleet keys are only used in vehicles configured for fleet use with RPO 6E2 or 6E8.

- Start the vehicle.
- Lock/unlock all of the door locks and rear compartment.
- Lock/unlock all of the storage compartments.

Security Indicator

The theft deterrent module (TDM) can command the instrument panel cluster (IPC) to illuminate the security indicator only when the ignition key is in the ON position. The TDM will command the security indicator be illuminated any time a fault is noted in the immobilizer system and when the engine starting is disabled.

Remote Vehicle Speed Limiting Description and Operation

Certain vehicles equipped with OnStar® now have an additional feature that allows for remote limiting of the vehicle's speed. This OnStar® feature is called Stolen Vehicle Slow-Down and is now part of the OnStar® Stolen Vehicle Assistance service. This feature, when used in conjunction with local law enforcement and strict guidelines at the OnStar® Call Center, will slow the vehicle by interacting with the engine control system.

When the engine control system receives a valid request from the OnStar® telematics communications interface module, it will enter into a reduced engine power/vehicle speed limiting mode, which will decelerate the vehicle. Once the request is active the engine control module begins reducing engine torque to match requested vehicle speed and a REDUCED ENGINE POWER indication is displayed. No DTCs will be set during this process.

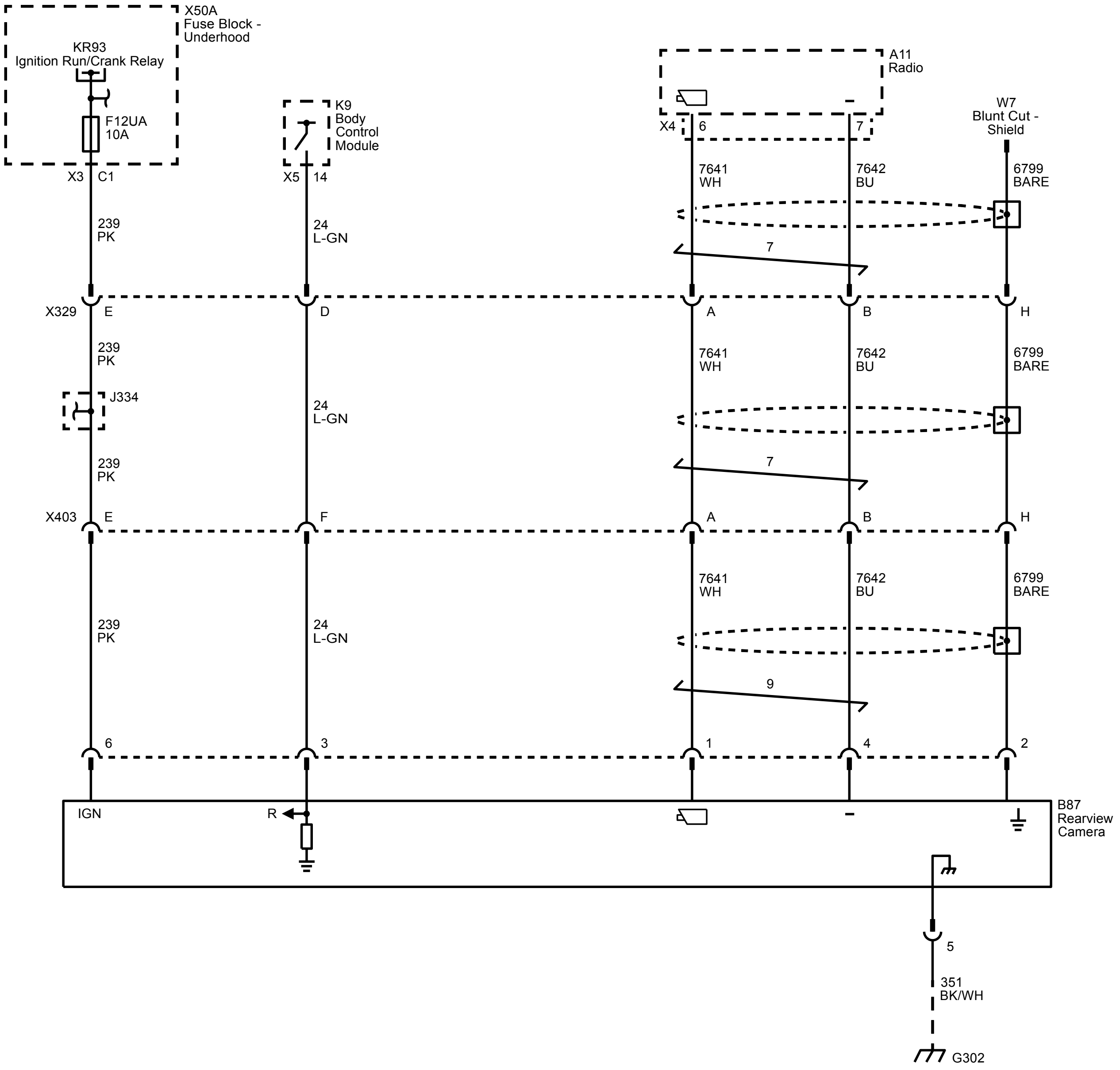
Safety and Security

Object Detection and Pedestrian Protection

Schematic and Routing Diagrams

Object Detection Schematics

Rear Vision Camera (UVC with UI8)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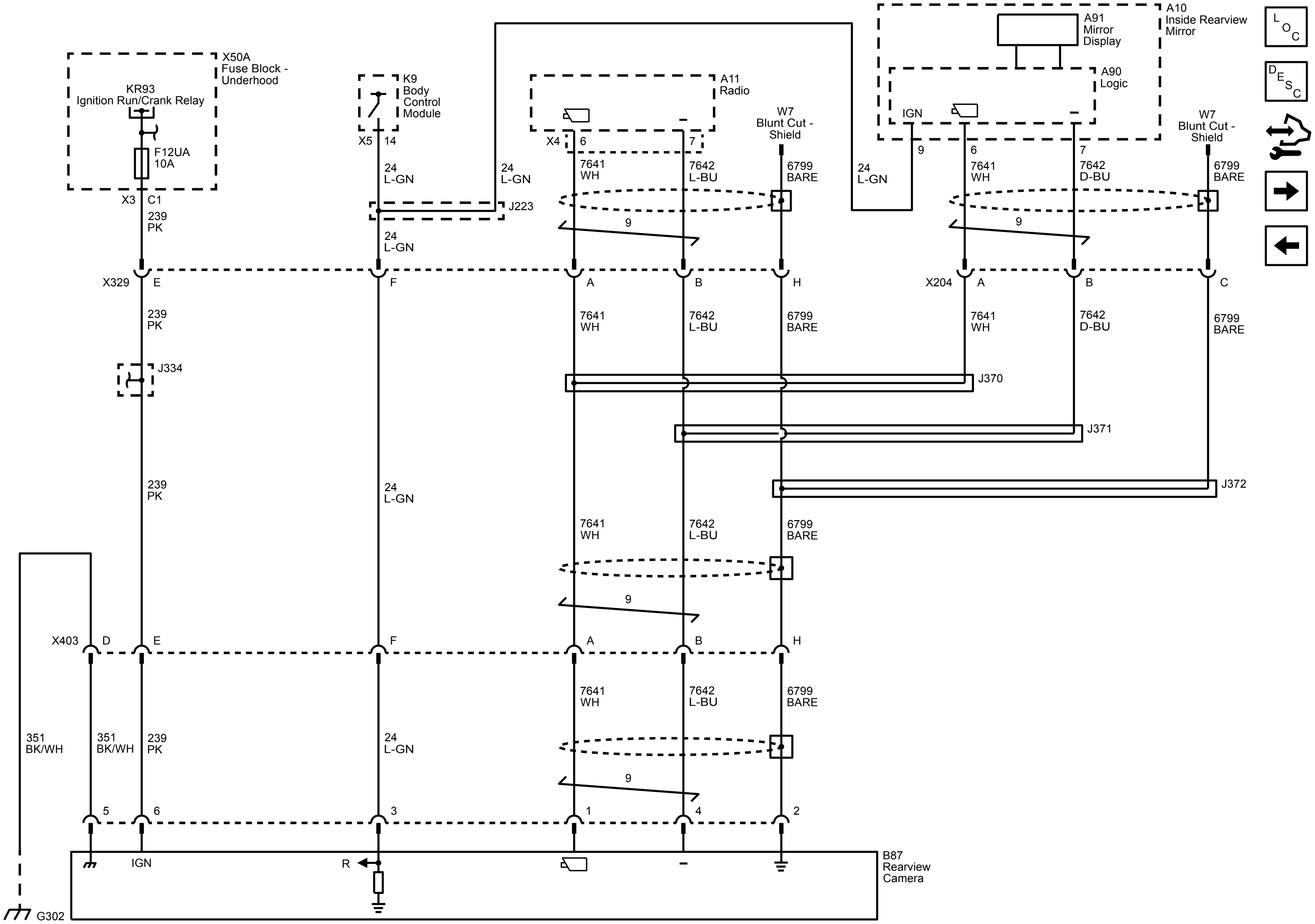
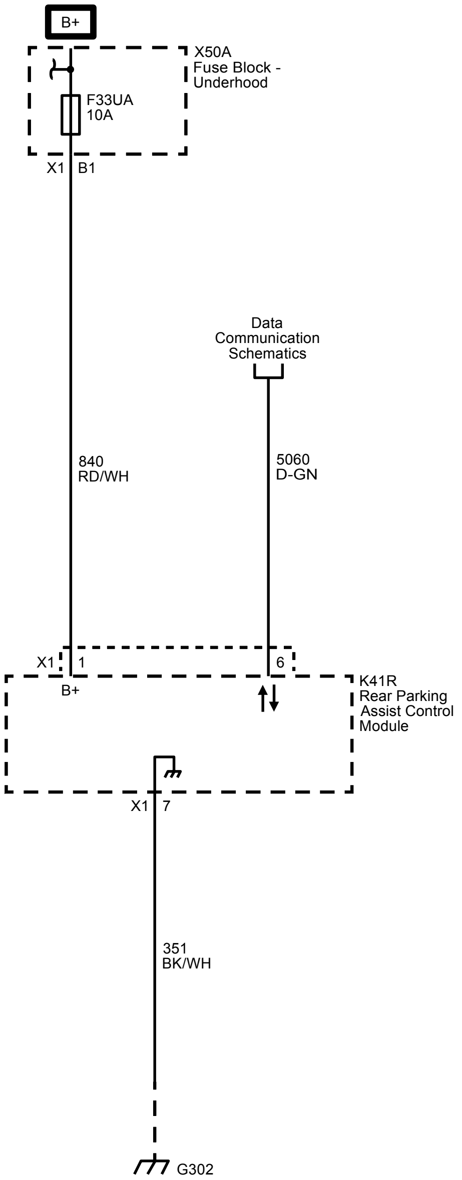
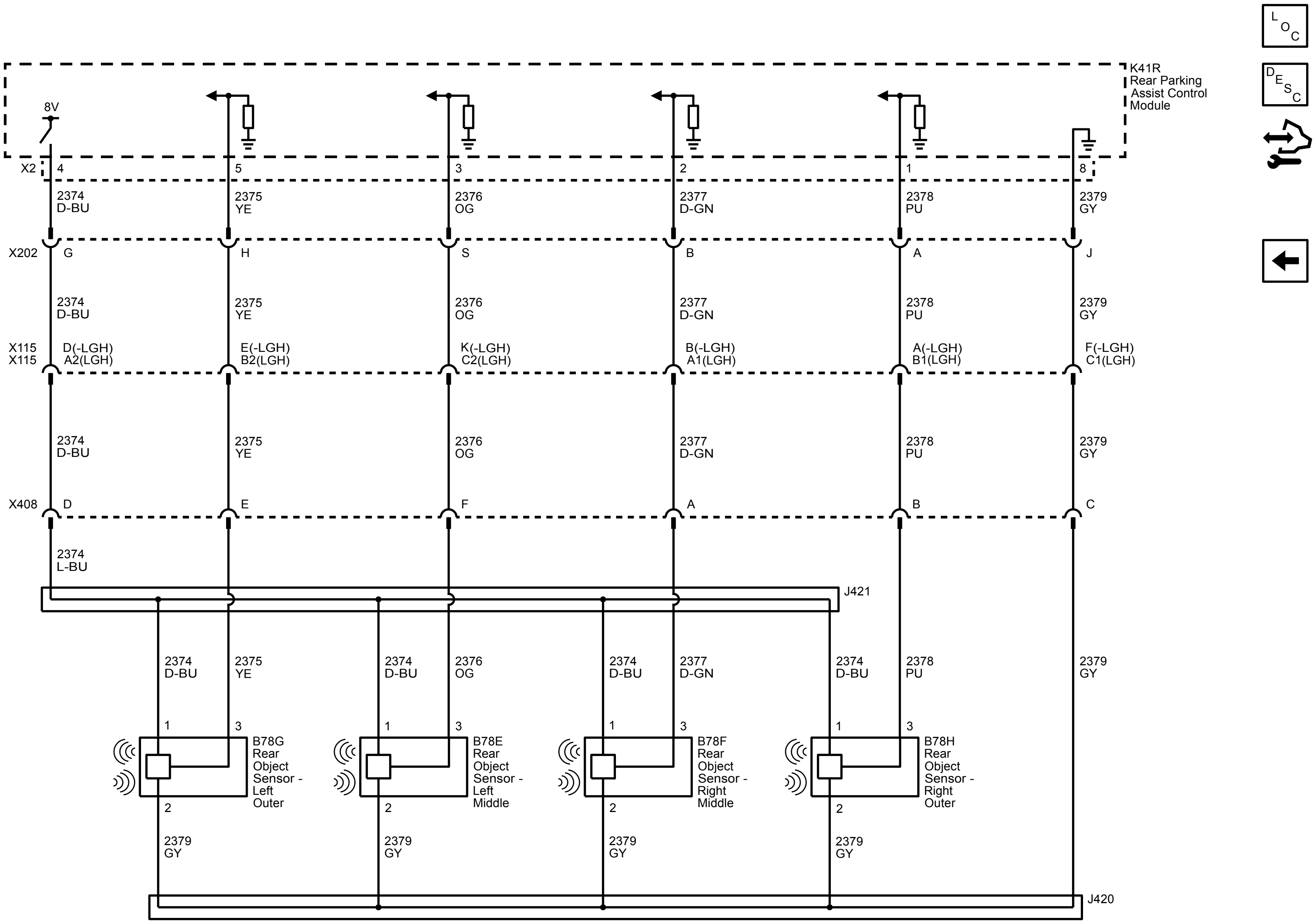
Fuse Block -
Underhood
KR93
Ignition Run/Crank Relay
F12UA
10A
X3 C1
239
PK
K9
Body
Control
Module
X5 14
24
L-GN
A11
Radio
X4 6
7
W7
Blunt Cut -
Shield
7641
WH
7642
BU
6799
BARE
7
X329 E
D
A
B
H
J334
X403 E
F
9
6
3
1
4
2
IGN
R
B87
Rearview
Camera
5
351
BK/WH
G302

Rear Vision Camera (UVC without UI8)


X50A
Fuse Block - Underhood
KR93
Ignition Run/Crank Relay
F12UA
10A
X3
C1
239
PK
K9
Body Control Module
X5
14
24
L-GN
J223
A11
Radio
X4
6
7
7641
WH
7642
L-BU
W7
Blunt Cut - Shield
6799
BARE
9
A91
Mirror Display
A10
Inside Rearview Mirror
A90
Logic
IGN
7642
D-BU
X329
E
F
A
B
H
X204
A
B
C
J334
J370
J371
J372
X403
D
E
F
A
B
H
351
BK/WH
5
6
3
1
4
2
IGN
R
B87
Rearview Camera
G302


B+
X50A
Fuse Block - Underhood
F33UA
10A
X1
B1
Data Communication Schematics
840
RD/WH
5060
D-GN
X1
1
6
B+
K41R
Rear Parking Assist Control Module
X1
7
351
BK/WH
G302

Rear Object Sensors (UD7)


K41R
Rear Parking
Assist Control
Module
8V
X2
4
5
3
2
1
8
2374
D-BU
2375
YE
2376
OG
2377
D-GN
2378
PU
2379
GY
X202
G
H
S
B
A
J
X115
X115
D(-LGH)
A2(LGH)
E(-LGH)
B2(LGH)
K(-LGH)
C2(LGH)
B(-LGH)
A1(LGH)
A(-LGH)
B1(LGH)
F(-LGH)
C1(LGH)
X408
D
E
F
A
B
C
2374
L-BU
J421
B78G
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Object
Sensor -
Left
Outer
B78E
Rear
Object
Sensor -
Left
Middle
B78F
Rear
Object
Sensor -
Right
Middle
B78H
Rear
Object
Sensor -
Right
Outer
J420
L O C
D E S C

Description and Operation

Object Detection Description and Operation (with rear camera UVC)

Rear Vision Camera System Operation

The rear vision camera system consists of a video camera located at the rear of the vehicle and the radio.

When the transmission is placed into REVERSE, a 12 volt signal is sent to the rear vision camera by the body control module (BCM). This signal indicates to the camera that the vehicle is in reverse and image display is requested. The rear vision camera receives ignition voltage and a constant ground to power the camera. Video signal + and video signal – circuits carry the video image from the rear vision camera to the radio. Additionally, the video signal circuits are shielded to prevent any interference which may lead to a loss of video signal resolution and a degraded video image. The shield is provided a ground path by the rear vision camera.

The following conditions may cause a degraded rear vision camera image:

- Ice, snow, or mud has built up on the rear vision camera
- Dark conditions
- Extreme light conditions, such as glare from the sun or the headlights of another vehicle
- Damage to the rear of the vehicle
- Extreme high temperatures or extreme temperature changes

If a malfunction is detected in the system, Service Rear Vision Camera may be displayed on the navigation radio as an indicator to the customer that a problem exists that requires service.

Object Detection Description and Operation (with rear park assist UD7)

The ultrasonic parking assist system is designed to identify and notify the driver of an object in the vehicles path when reversing at speeds of less than 8 km/h (5 MPH). The distance and location of the object is determined by 4 object sensors located in the rear bumper. The parking assist system will notify the driver using an audible beep signal through the radio rear speakers.

The parking assist system is made up of the following components:

- Parking assist control module
- Rear object alarm sensors

Parking Assist Control Module

The parking assist control module provides an 8 V reference and a low reference to the four object alarm sensors. The parking assist control module receives individual signals from each of the four sensors and determines the location and distance of an object based on these inputs. When an object is detected, the parking assist control module will send a data message via CAN-Bus to the radio requesting an audible alert.

Rear Object Alarm Sensors

The object alarm sensors are located in the rear bumper of the vehicle. The sensors are used to determine the distance between an object and the bumper. Each sensor emits an ultrasonic frequency which is reflected off any object located behind the vehicle. These reflections are received by the sensors. The time difference between the emission of the frequency and when the reflection is received is known as sensor echo time, it is used to determine the distance to the object. The sensors report this information to the parking assist control module.

Rear Parking Assist Operation

When the vehicle is first placed into reverse there will be one audible beep through the rear speakers, to indicate that the system is working. If rear speakers are inoperable no audible signals will occur.

When backing up at speed of less than 8 km/h (5 MPH), the system is constantly monitoring for object of interest located behind the vehicle. The rear parking assist system can detect objects greater than 7.6 cm (3 in) wide and 25.4 cm (10 in) tall. The system cannot detect objects below the bumper, underneath the vehicle. If an object is detected within 2.5 m (8 ft) there will be a audible beep notification out of both rear speakers based upon the distance to the object. As the vehicle gets closer to an object, the time between the beeps become shorter.

If the vehicle stops in a range zone the beeping will stop after 5 s. When the distance between the object and the vehicle changes, beeping will start again.

If the rear parking assist system detects a malfunction the single audible beep will not chime when put into reverse along with a DTC being stored. The object alarm module will send a serial data message to the instrument panel cluster to display the SERVICE PARK ASSIST message on the driver information center.

Parking Assist System Driver Information Center Messages

SERVICE PARK ASSIST

The driver information center displays SERVICE PARK ASSIST when the parking assist control module detects a malfunction in the rear parking assist system and the system is disabled. The driver information center also displays SERVICE PARK ASSIST when a loss of communication occurs with the parking assist control module.

PARK ASSIST OFF

The PARK ASSIST OFF message is displayed in the driver information center when the parking assist system is disabled due to conditions that disable or inhibit the system. The parking assist control module requests the driver information center display PARK ASSIST OFF when it detects that one of the following conditions:

- The rear parking assist system is manually disabled by the vehicle operator through the audio system personalization menu.
- The park brake is applied or not fully released.
- An object is attached to the rear of the vehicle, such as a trailer, bicycle rack, trailer hitch receiver, or tow bar. Also, an object extending beyond a lowered endgate will disable the system.
- The parking assist sensors are covered by snow, mud, dirt or ice.
- The vehicle bumper is damaged.
- Excessive paint thickness on a replacement parking assist sensor.
- The parking assist sensors are disrupted by vibrations, like those caused by a large nearby vehicle or from heavy equipment such as a jackhammer.

Parking Assist Description and Operation

The ultrasonic parking assist system is designed to identify and notify the driver of an object in the vehicles path when reversing at speeds of less than 8 km/h (5 MPH). The distance and location of the object is determined by 4 object sensors located in the rear bumper. The parking assist system will notify the driver using an audible beep signal through the radio rear speakers.

The parking assist system is made up of the following components:

- Parking assist control module
- Rear object alarm sensors

Parking Assist Control Module

The parking assist control module provides an 8 V reference and a low reference to the four object alarm sensors. The parking assist control module receives individual signals from each of the four sensors and determines the location and distance of an object based on these inputs. When an object is detected, the parking assist control module will send a data message via CAN-Bus to the radio requesting an audible alert.

Rear Object Alarm Sensors

The object alarm sensors are located in the rear bumper of the vehicle. The sensors are used to determine the distance between an object and the bumper. Each sensor emits an ultrasonic frequency which is reflected off any object located behind the vehicle. These reflections are received by the sensors. The time difference between the emission of the frequency and when the reflection is received is known as sensor echo time, it is used to determine the distance to the object. The sensors report this information to the parking assist control module.

Rear Parking Assist Operation

When the vehicle is first placed into reverse there will be one audible beep through the rear speakers, to indicate that the system is working. If rear speakers are inoperable no audible signals will occur.

When backing up at speed of less than 8 km/h (5 MPH), the system is constantly monitoring for object of interest located behind the vehicle. The rear parking assist system can detect objects greater than 7.6 cm (3 in) wide and 25.4 cm (10 in) tall. The system cannot detect objects below the bumper, underneath the vehicle. If an object is detected within 2.5 m (8 ft) there will be a audible beep notification out of both rear speakers based upon the distance to the object. As the vehicle gets closer to an object, the time between the beeps become shorter.

If the vehicle stops in a range zone the beeping will stop after 5 s. When the distance between the object and the vehicle changes, beeping will start again.

If the rear parking assist system detects a malfunction the single audible beep will not chime when put into reverse along with a DTC being stored. The object alarm module will send a serial data message to the instrument panel cluster to display the SERVICE PARK ASSIST message on the driver information center.

Parking Assist System Driver Information Center Messages

SERVICE PARK ASSIST

The driver information center displays SERVICE PARK ASSIST when the parking assist control module detects a malfunction in the rear parking assist system and the system is disabled. The driver information center also displays SERVICE PARK ASSIST when a loss of communication occurs with the parking assist control module.

PARK ASSIST OFF

The PARK ASSIST OFF message is displayed in the driver information center when the parking assist system is disabled due to conditions that disable or inhibit the system. The parking assist control module requests the driver information center display PARK ASSIST OFF when it detects that one of the following conditions:

- The rear parking assist system is manually disabled by the vehicle operator through the audio system personalization menu.
- The park brake is applied or not fully released.
- An object is attached to the rear of the vehicle, such as a trailer, bicycle rack, trailer hitch receiver, or tow bar. Also, an object extending beyond a lowered endgate will disable the system.
- The parking assist sensors are covered by snow, mud, dirt or ice.
- The vehicle bumper is damaged.
- Excessive paint thickness on a replacement parking assist sensor.
- The parking assist sensors are disrupted by vibrations, like those caused by a large nearby vehicle or from heavy equipment such as a jackhammer.

Rear Vision Camera Description and Operation

The rear vision camera system consists of the rearview camera and the infotainment system.

When the transmission is placed into R, 12 V is applied to the reverse lamp control circuit by the body control module (BCM). The rearview camera monitors this circuit and when 12 V is seen, indicating that the transmission is in R, the rearview camera will activate. The rearview camera receives ignition voltage and a constant ground to power the camera. Video signal + and video signal – circuits carry the video image from the rearview camera to the infotainment system. Additionally, the video signal circuits are shielded to prevent any interference which may lead to a loss of video signal resolution and cause a degraded video image. The shield is grounded by the rearview camera.

The following conditions may cause a degraded rear vision camera image:

- Ice, snow, or mud has built up on the rear vision camera
- Dark conditions
- Extreme light conditions, such as glare from the sun or the headlights of another vehicle
- Damage to the rear of the vehicle
- Extreme high temperatures or extreme temperature changes

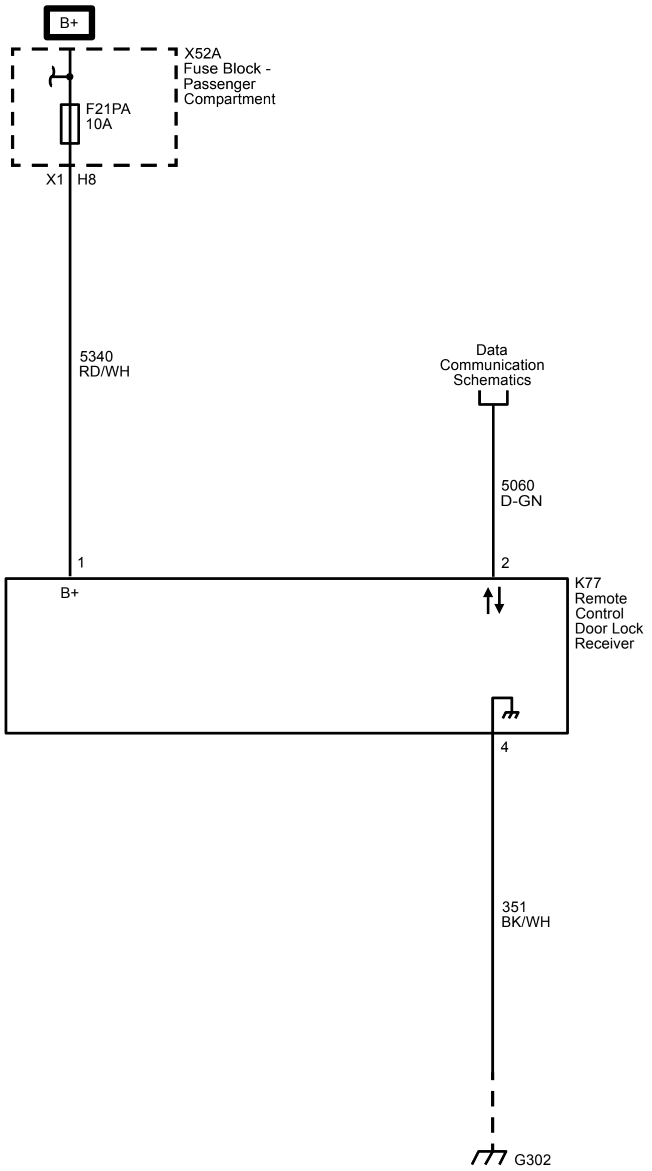
Safety and Security

Remote Functions

Schematic and Routing Diagrams

Remote Function Schematics

Keyless Entry (ATG or UJM)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X52A
Fuse Block -
Passenger
Compartment
F21PA
10A
X1
H8
5340
RD/WH
Data
Communication
Schematics
5060
D-GN
1
2
B+
K77
Remote
Control
Door Lock
Receiver
4
351
BK/WH
G302

Description and Operation

Keyless Entry System Description and Operation

The keyless entry system is a vehicle entry device. The keyless entry system is used in conjunction with the body control module (BCM) to remotely activate certain vehicle features. Keyless entry will lock/unlock the doors when a corresponding button on the keyless entry transmitter is pressed. This is accomplished by the transmitter sending a radio frequency to the remote control door lock receiver (RCDLR). The RCDLR interprets the signal and activates the requested function via a serial data message to the BCM. A low transmitter or vehicle battery or radio frequency (RF) interference from aftermarket devices, such as 2-way radios, power inverters, computers, etc., may cause a system malfunction. High RF traffic areas may also cause interference that could lead to a malfunction. Keyless entry allows you to operate the following components:

- Door locks
- Cargo door unlock
- Vehicle locator/Panic alarm
- Illuminated entry lamps

The keyless entry system has the following components:

- Keyless entry transmitters
- BCM
- RCDLR

Keyless Entry Transmitters

The keyless entry transmitter are used to lock and unlock the vehicle doors from a distance of up to 65 feet (20 m) away. Up to 8 transmitters may be programmed to a single vehicle.

OnStar® Remote Link

A vehicle operator may have the ability to perform some of the keyless entry functions using applications on personal devices such as smart phones. Refer to OnStar Description and Operation.

Remote Control Door Lock Receiver (RCDLR)

The remote control door lock receiver (RCDLR) is a multifunction module that operates both the keyless entry system as well as the tire pressure monitoring (TPM) system. The RCDLR has an internal antenna that is used to receive radio frequency (RF) communications sent by the keyless entry transmitters. When an RF message is received from a keyless entry transmitter, the RCDLR interprets this signal and will request via serial data that the body control module (BCM) perform the specific function, i.e. door lock, door unlock, or vehicle locate. The RCDLR also receives RF signals from the TPM sensors located at each wheel.

Unlock Driver Door Only

Momentarily press the transmitter UNLOCK button in order to perform the following functions:

- Unlock only the driver door.
- Illuminate the interior lamps for a determined length of time, or until the ignition is turned ON.
- Flash the exterior lights, if enabled through personalization.

Unlock All Doors – Second Operation

Momentarily press the transmitter UNLOCK button a second time, within 5 seconds of the first press, to perform the following functions:

- Unlock the remaining doors.
- Unlock the cargo doors.

Cargo Door Unlock

Momentarily press the transmitter cargo door unlock button a second time, within 5 seconds of the first press, to perform the following function:

Unlock only the cargo doors.

Lock All Doors

Press the transmitter LOCK button to perform the following functions:

- Lock all vehicle doors.
- Immediately turn OFF the interior lamps.
- Flash the exterior lights, if enabled through personalization.
- Chirp the horn, if enabled through personalization.

Vehicle Locator/Panic Alarm

A single press of the panic button performs the following functions. Some functions may be dependent on personalization settings:

- Pulse the horn three times.
- Flash the exterior lamps three times.

A press and hold of the panic button performs the following functions:

- Illuminate the interior lamps.
- Pulse the horn and flash the exterior lamps for 30 second or until the following conditions occur:
  - The panic button is pressed.
  - The ignition switch is turned to the RUN position with a valid key.

Remote Vehicle Start (RVS) – if equipped

The remote vehicle start (RVS) function allows engine starting while not in the vehicle. It also allows the vehicle HVAC system and other vehicle systems to enable, providing a comfortable vehicle upon entry. RVS functions have an operating range of up to 195 feet, depending on conditions. The RVS sequence begins by pressing and releasing the lock button and then pressing and holding the RVS buttons on the keyless entry transmitter. The turn signal lamps will illuminate to indicate the vehicle has received the remote start request. Each time an RVS is performed, the vehicle doors are locked, however they may then be unlocked/locked with the transmitter or vehicle key at any time. Once activated, the engine is allowed to run for 10 minutes. The RVS time may be extended by an additional 10 minute by again pressing and releasing the lock button and then pressing and holding the RVS buttons on the transmitter. This feature is called a RVS continue and allows a maximum of 20 minutes of engine running. If the RVS continue is performed at 7 minutes into the initial 10 minute time-out, a total of 17 minutes of engine running would occur. The RVS event may be suspended at any time by pressing only the RVS button on the transmitter or by entering the vehicle and turning ON the hazard lamps.

In between ignition cycles, only two RVS events may occur or be attempted. Once two events or attempts have been made, future RVS events will be suspended until the vehicle is started using the ignition.

Enable/Disable RVS

Using the driver information center (DIC), RVS may be enabled or disabled as a part of vehicle personalization. Refer to the vehicle owners manual for more information.

Hood Ajar Switch

The hood switch provides status of the hood to the BCM for RVS purposes. The switch is integrated into the hood latch assembly. The hood ajar switch provides 2 separate inputs to the BCM. These separate inputs allow the BCM to actively monitor for a hood ajar switch fault.

RVS Circuit Description

The RCDLR receives a signal from the keyless entry transmitter indicating a RVS request. A message is then sent to the BCM which determines if a crank request message will be sent to the ECM to allow engine starting. To determine if conditions are correct for an RVS event, the BCM will ensure the following conditions are met:

- All vehicle doors are closed
- A valid hood ajar switch closed signal is present
- The doors are locked
- The hazard switch is OFF
- The vehicle power mode is correct
- No content theft deterrent (CTD) alarm triggers are present
- The vehicle is not in valet mode (if equipped)

When the BCM determines all conditions meet those required for an RVS event, a message is sent via serial data to the ECM. The ECM relies on the RVS message from BCM to enable RVS when the crank request signal is received. If the ECM does not receive a valid RVS message, it will not attempt to start the engine. While the ECM is in RVS mode it will suspend engine operation if any of the following additional conditions occur:

- Vehicle speed is greater than 0
- Transmission is not in PARK
- Excessive engine coolant temperature
- Low oil pressure
- The malfunction indicator lamp (MIL) is commanded ON
- Engine crank time is greater than 30 seconds
- Excessive engine speed
- Accelerator pedal position too high
- Remote start timer equals 0
- Immobilizer system indicates tamper

Keyless Entry Personalization

Vehicle lock/unlock functions and remote vehicle start (RVS) settings may be personalized. For functional descriptions and personalization instructions, refer to the vehicle owners manual.

Rolling Code

The Keyless Entry System uses rolling code technology. Rolling code technology prevents anyone from recording the message sent from the transmitter and using the message in order to gain entry to the vehicle. The term “rolling code” refers to the way that the Keyless Entry System sends and receives the signals. The transmitter sends the signal in a different order each time. The transmitter and the remote control door lock receiver (RCDLR) are synchronized to the appropriate order. If a programmed transmitter sends a signal that is not in the order that the RCDLR expects, then the transmitter is out of synchronization. This occurs after 256 presses of any transmitter button when it is out of range of the vehicle.

Automatic Synchronization

The keyless entry transmitters do not require a manual synchronization procedure. If needed, the transmitters automatically re-synchronize when any button on the transmitter is pressed within range of the vehicle. The transmitter will operate normally after the automatic synchronization.

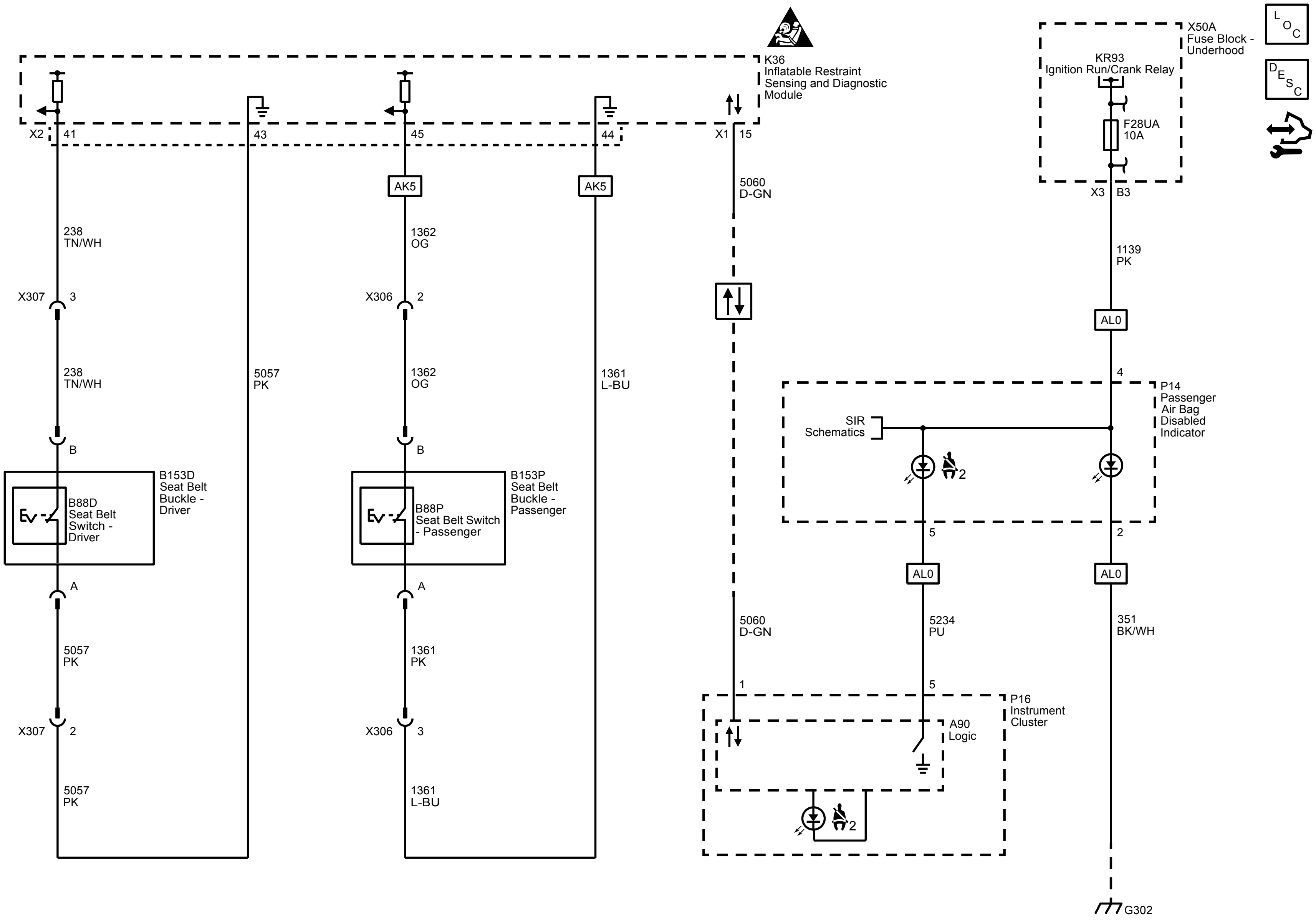
Safety and Security

Seat Belts

Schematic and Routing Diagrams

Seat Belt Schematics

Seat Belt Schematics


K36
Inflatable Restraint
Sensing and Diagnostic
Module
X2
41
43
45
44
X1
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AK5
AK5
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TN/WH
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OG
5060
D-GN
X307
3
X306
2
238
TN/WH
1362
OG
5057
PK
1361
L-BU
B
B
B88D
Seat Belt
Switch -
Driver
B153D
Seat Belt
Buckle -
Driver
B88P
Seat Belt Switch
- Passenger
B153P
Seat Belt
Buckle -
Passenger
A
A
5057
PK
1361
PK
X307
2
X306
3
5057
PK
1361
L-BU
X50A
Fuse Block -
Underhood
KR93
Ignition Run/Crank Relay
F28UA
10A
X3
B3
1139
PK
AL0
4
P14
Passenger
Air Bag
Disabled
Indicator
SIR
Schematics
2
5
2
AL0
AL0
5060
D-GN
5234
PU
351
BK/WH
1
5
P16
Instrument
Cluster
A90
Logic
2
G302
L
O
C
D
E
S
C

Description and Operation

Seat Belt System Description and Operation

Restraint System

Seat belts are the primary means of occupant restraint.

Seat belts help to keep occupants inside the passenger compartment and to gradually reduce the impact forces.

All seat belt retractors have emergency locks. The retractors remain unlocked during normal operation and under normal driving conditions. The retractors remain unlocked during normal conditions in order to allow free movement of the upper body of each occupant.

A pendulum locks the seat belt webbing into position. The pendulum causes a locking bar to engage a cog on the spool of the retractor mechanism when the following conditions occur:

- A rapid extraction of the seat belt webbing from the retractor
- An abrupt change in the vehicle speed
- An abrupt change in the vehicle direction
- Operation of the vehicle on a steep upgrade
- Operation of the vehicle on a steep downgrade

The seat belts, except for the driver seat belt, have an automatic locking feature, or a cinch feature. The cinch feature is recommended for securing a child seat. The cinch feature is engaged by fully extending the seat belt from the retractor. Once engaged, the seat belt can retract, but cannot be extended again until the cinch feature is cancelled. The cinch feature is cancelled when the seat belt has fully retracted.

This vehicle is also equipped with a supplemental inflatable restraint (SIR) system. Refer to Supplemental Inflatable Restraint System Description and Operation for a description of the seat belt retractor pretensioner.

Front Seat Belt System

The front seat belt system includes the following components:

- The driver and passenger seat belt buckles, attached to the inboard side of the seat frame
- The driver and passenger seat belt retractor pretensioners
- The driver and passenger seat belt switch located in the seat belt buckles

Seat Belt System Circuit Description

There are two fasten safety belt indicators for this vehicle. The driver fasten safety belt indicator is located on the instrument panel cluster (IPC) and the passenger fasten safety belt indicator is located in the passenger ON/OFF indicator. Both indicators are controlled by the IPC at the request of the inflatable restraint sensing and diagnostic module (SDM). The driver indicator, when initiated, will illuminate for 20 seconds followed by 55 seconds of flashing. Audible warnings will initiate simultaneously with visual warnings and last for 8 seconds. Subsequently, similar events will occur until the seat belts are buckled or the ignition is returned to the OFF position.

The driver fasten safety belt indicator will illuminate when any of the following occur:

- The driver seat belt is unbuckled while the ignition is ON.
- The driver seat belt remains unbuckled and vehicle speed is greater than 8 km/h (5 mph).
- Three minutes after previous seat belt status reminder event
- The IPC performs the displays test at the start of each ignition cycle.

Important: The front passenger seat is equipped with a passenger presence system (PPS), which detects an occupant. If the PPS detects an empty front passenger seat, then the passenger fasten safety belt indicator will be disabled.

The passenger fasten safety belt indicator will illuminate when any of the following occur:

- Twenty-five seconds after the ignition is ON and the front passenger seat belt remains unbuckled with passenger present
- The front passenger seat belt remains unbuckled with passenger present and vehicle speed is greater than 5 mph (8 km/h).
- Three minutes after previous seat belt status reminder event
- The IPC performs the displays test at the start of each ignition cycle.

Refer to CELL Link Error - Link target cell (cell ID 56800) is invalid for this publication. in order to diagnose faults of the fasten safety belt indicators.

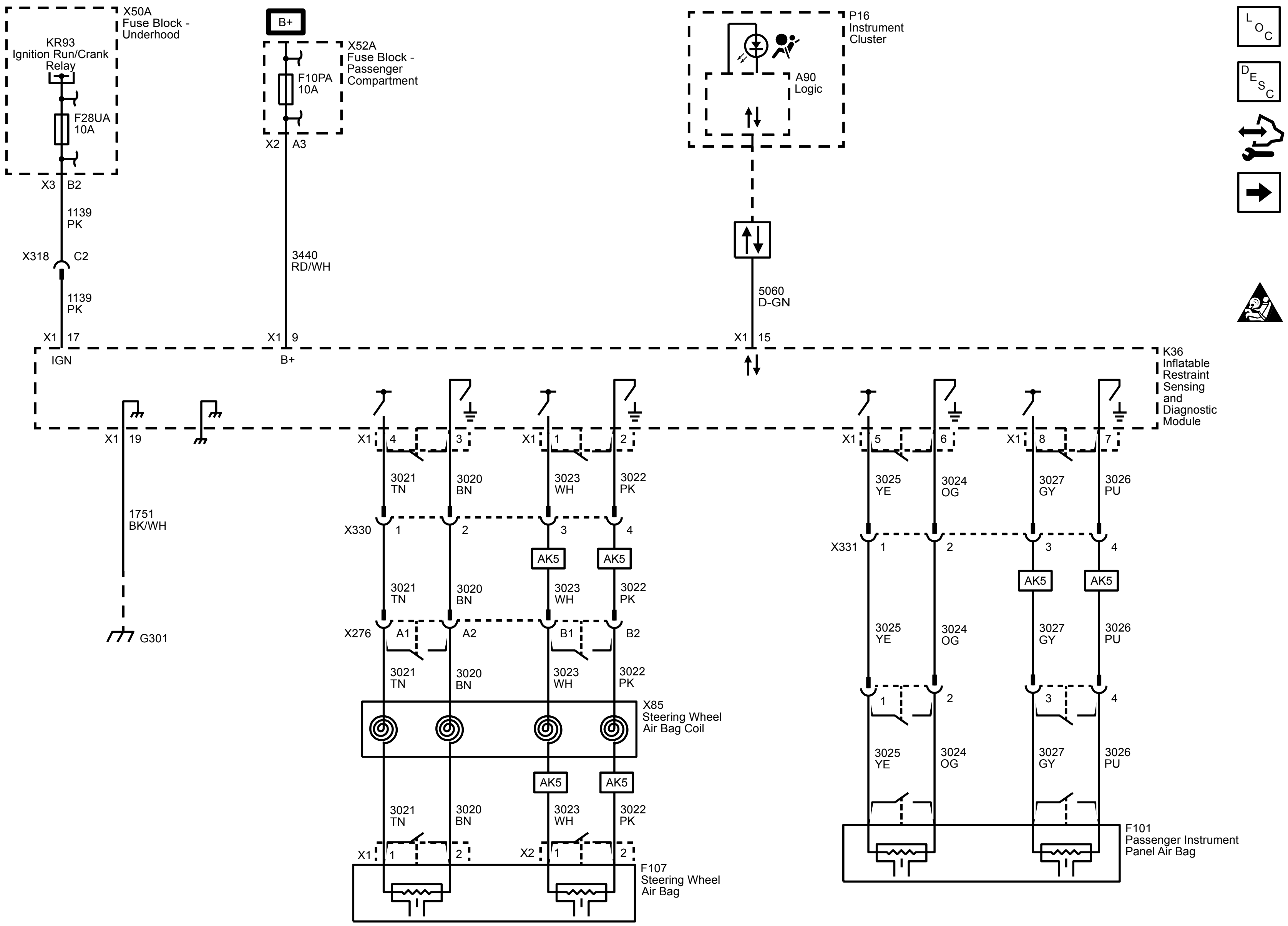
Safety and Security

Supplemental Inflatable Restraints

Schematic and Routing Diagrams

SIR Schematics

Module Power, Ground, Serial Data, and Front Air Bags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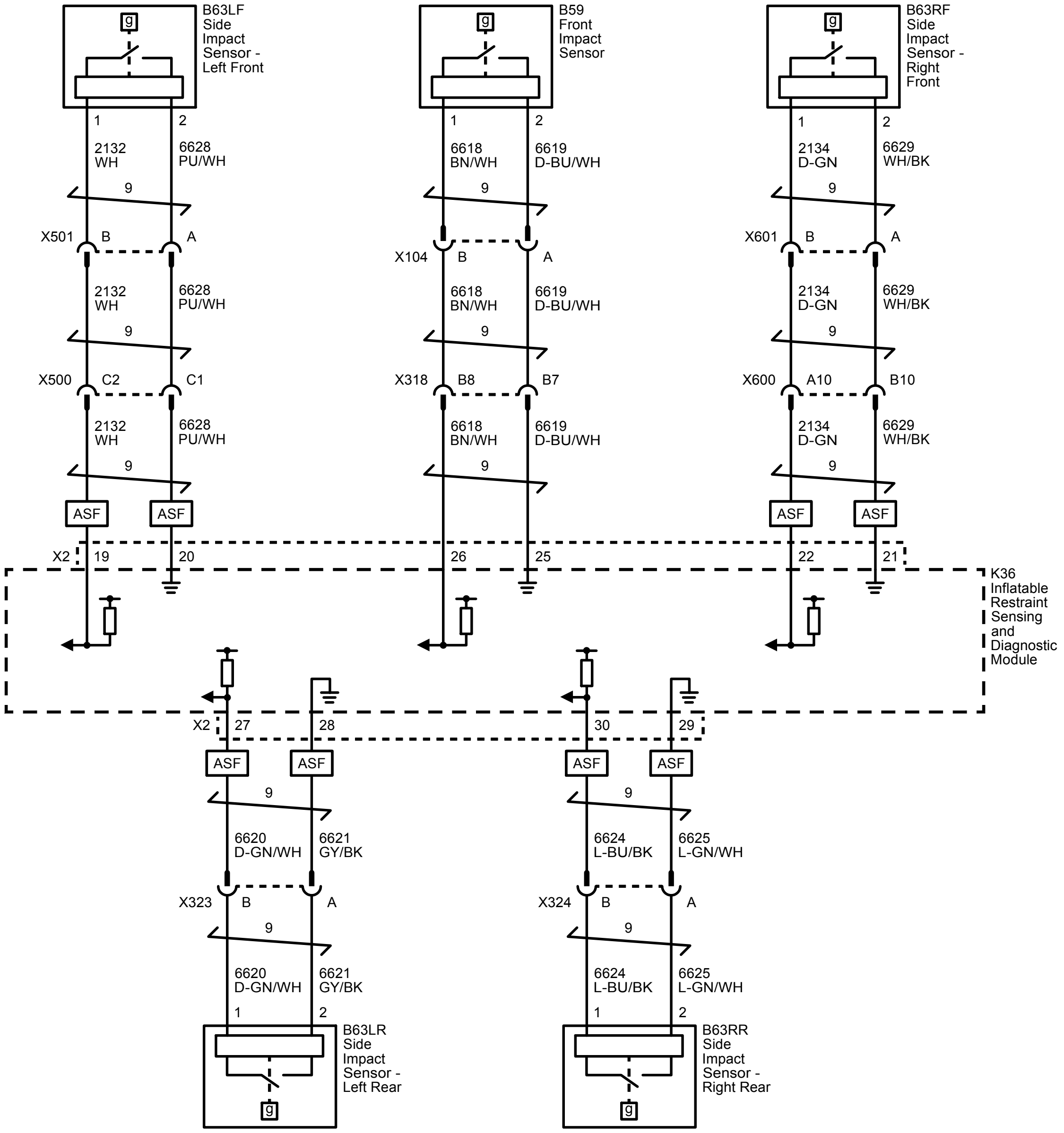
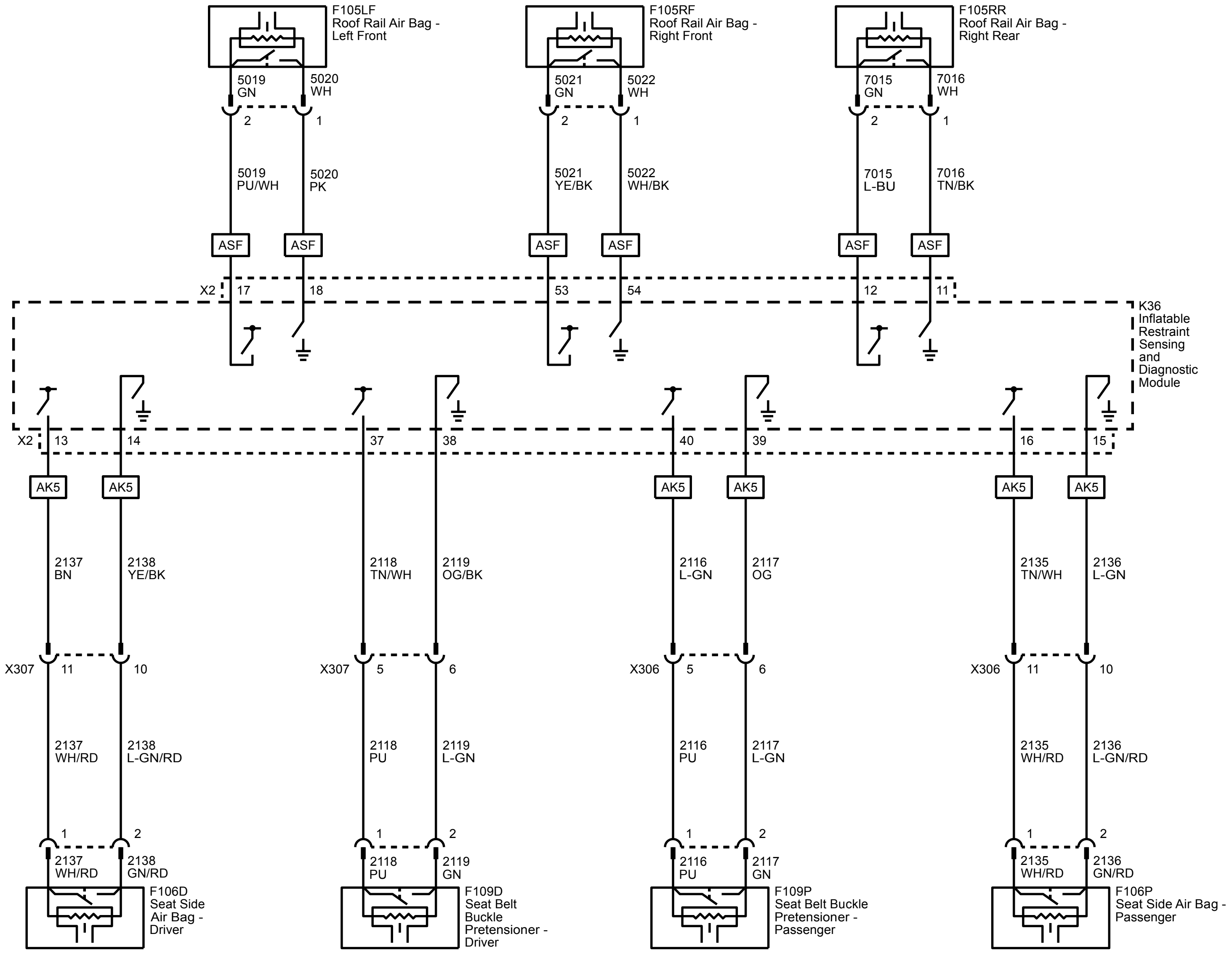
Fuse Block - Underhood
KR93
Ignition Run/Crank Relay
F28UA
10A
X3
B2
1139
PK
X318
C2
1139
PK
X1
17
IGN
B+
X52A
Fuse Block - Passenger Compartment
F10PA
10A
X2
A3
3440
RD/WH
X1
9
B+
P16
Instrument Cluster
A90
Logic
5060
D-GN
X1
15
K36
Inflatable Restraint Sensing and Diagnostic Module
X1
19
1751
BK/WH
G301
X1
4
3
3021
TN
3020
BN
X1
1
2
3023
WH
3022
PK
X330
1
2
3
4
AK5
AK5
X276
A1
A2
B1
B2
X85
Steering Wheel Air Bag Coil
AK5
AK5
X1
1
2
X2
1
2
F107
Steering Wheel Air Bag
X1
5
6
3025
YE
3024
OG
X1
8
7
3027
GY
3026
PU
X331
1
2
3
4
AK5
AK5
1
2
3
4
F101
Passenger Instrument Panel Air Bag
L O C
D E S C


B63LF
Side
Impact
Sensor -
Left Front
B59
Front
Impact
Sensor
B63RF
Side
Impact
Sensor -
Right
Front
1
2
2132
WH
6628
PU/WH
6618
BN/WH
6619
D-BU/WH
2134
D-GN
6629
WH/BK
9
X501
B
A
X104
X601
X500
C2
C1
X318
B8
B7
X600
A10
B10
ASF
X2
19
20
26
25
22
21
K36
Inflatable
Restraint
Sensing
and
Diagnostic
Module
27
28
30
29
6620
D-GN/WH
6621
GY/BK
6624
L-BU/BK
6625
L-GN/WH
X323
X324
B63LR
Side
Impact
Sensor -
Left Rear
B63RR
Side
Impact
Sensor -
Right Rear
g

Roof Rail Air Bags, Seat Side Air Bags, and Seat Belt Pretensioners


F105LF
Roof Rail Air Bag -
Left Front
F105RF
Roof Rail Air Bag -
Right Front
F105RR
Roof Rail Air Bag -
Right Rear
5019
GN
5020
WH
2
1
5019
PU/WH
5020
PK
5021
GN
5022
WH
2
1
5021
YE/BK
5022
WH/BK
7015
GN
7016
WH
2
1
7015
L-BU
7016
TN/BK
ASF
ASF
ASF
ASF
ASF
ASF
X2
17
18
53
54
12
11
K36
Inflatable
Restraint
Sensing
and
Diagnostic
Module
X2
13
14
37
38
40
39
16
15
AK5
AK5
AK5
AK5
AK5
AK5
2137
BN
2138
YE/BK
2118
TN/WH
2119
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2116
L-GN
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2136
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X307
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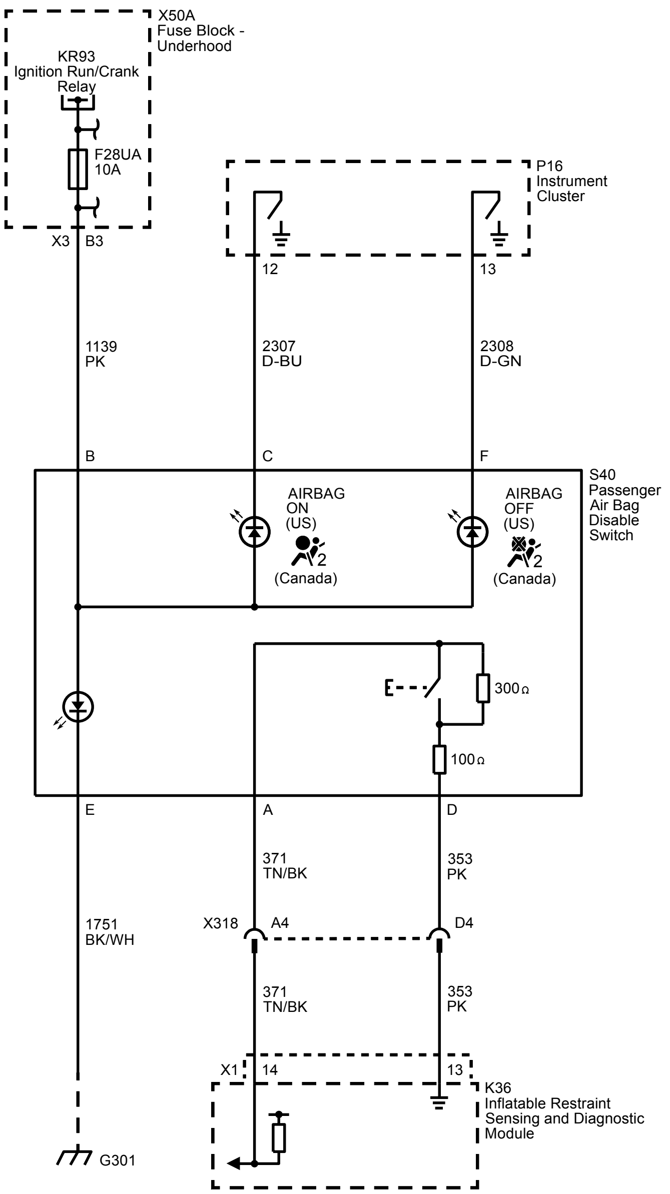
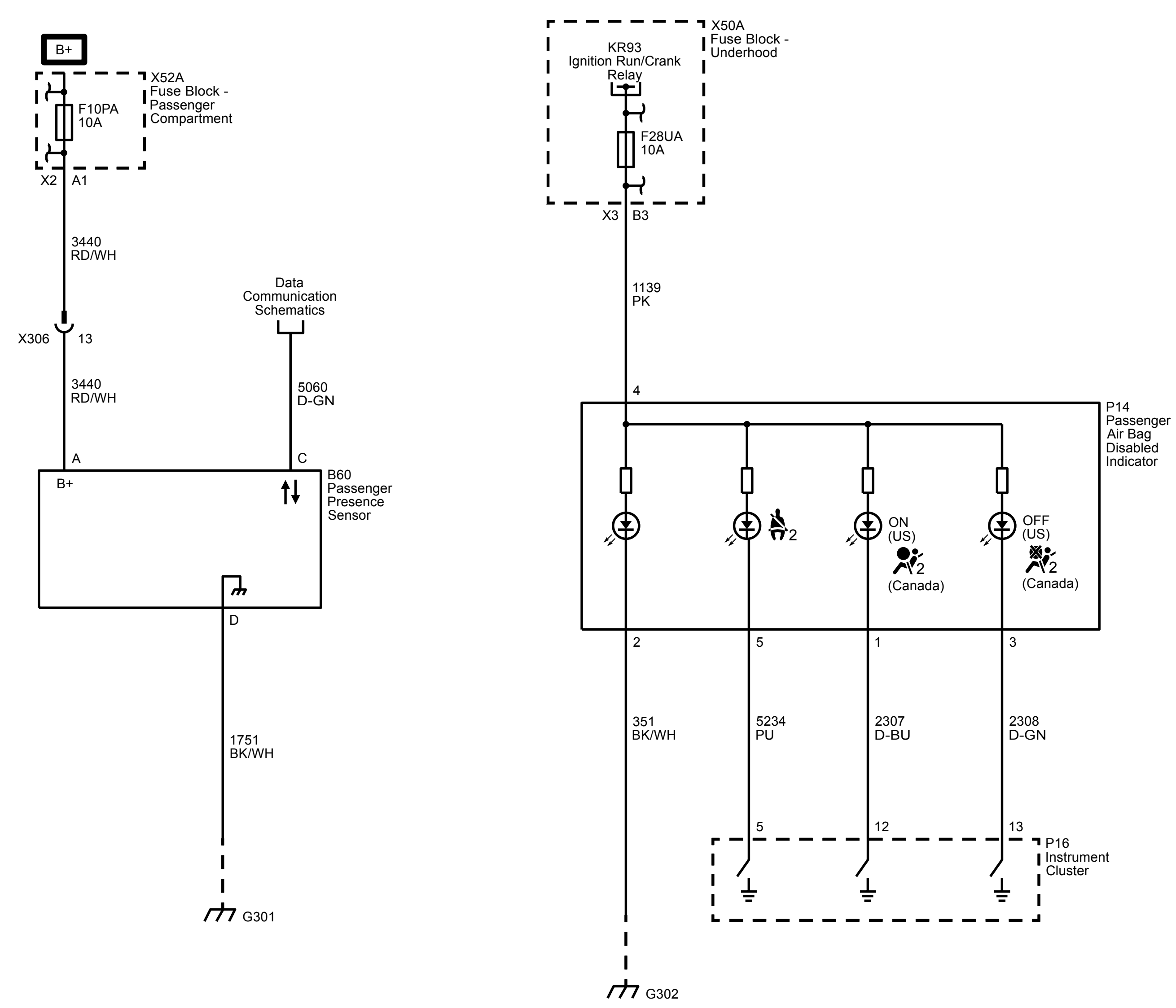
X306
5
6
X306
11
10
2137
WH/RD
2138
L-GN/RD
2118
PU
2119
L-GN
2116
PU
2117
L-GN
2135
WH/RD
2136
L-GN/RD
1
2
1
2
1
2
1
2
2137
WH/RD
2138
GN/RD
2118
PU
2119
GN
2116
PU
2117
GN
2135
WH/RD
2136
GN/RD
F106D
Seat Side
Air Bag -
Driver
F109D
Seat Belt
Buckle
Pretensioner -
Driver
F109P
Seat Belt Buckle
Pretensioner -
Passenger
F106P
Seat Side Air Bag -
Passenger

Passenger Air Bag Disable Switch (C99)



X50A
Fuse Block - Underhood
KR93
Ignition Run/Crank Relay
F28UA
10A
X3
B3
P16
Instrument Cluster
12
13
1139
PK
2307
D-BU
2308
D-GN
B
C
F
S40
Passenger Air Bag Disable Switch
AIRBAG
ON
(US)
2
(Canada)
AIRBAG
OFF
(US)
2
(Canada)
300Ω
100Ω
E
A
D
371
TN/BK
353
PK
1751
BK/WH
X318
A4
D4
371
TN/BK
353
PK
X1
14
13
K36
Inflatable Restraint Sensing and Diagnostic Module
G301

Passenger Presence Sensor and Passenger Air Bag Disabled Indicator (AL0)


B+
X52A
Fuse Block -
Passenger
Compartment
F10PA
10A
X2
A1
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RD/WH
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RD/WH
Data
Communication
Schematics
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D-GN
A
C
B+
B60
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Sensor
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1751
BK/WH
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KR93
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Fuse Block -
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X3
B3
1139
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Air Bag
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ON
(US)
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(Canada)
OFF
(US)
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(Canada)
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5
1
3
351
BK/WH
5234
PU
2307
D-BU
2308
D-GN
5
12
13
P16
Instrument
Cluster
G302

Description and Operation

Supplemental Inflatable Restraint System Description and Operation

SIR System Overview

The supplemental inflatable restraint (SIR) system supplements the protection offered by the seat belts. The SIR system contains an Inflatable Restraint Sensing and Diagnostic Module (SDM), air bags, seat belt pretensioners (buckle), and impact sensors. The Inflatable Restraint Sensing and Diagnostic Module determines the severity of a collision with the assistance of impact sensors located at strategic points on the vehicle. When the Inflatable Restraint Sensing and Diagnostic Module detects a collision, the Inflatable Restraint Sensing and Diagnostic Module will process the information provided by the sensors to further support air bag or pretensioner deployment. The Inflatable Restraint Sensing and Diagnostic Module will deploy the air bags and pretensioners if it detects a collision of sufficient force. If the force of the impact is not sufficient to warrant air bag deployment, the Inflatable Restraint Sensing and Diagnostic Module may still deploy the seat belt pretensioners. The Inflatable Restraint Sensing and Diagnostic Module contains a sensing device that converts vehicle velocity changes to an electrical signal. The Inflatable Restraint Sensing and Diagnostic Module compares these signals to values stored in memory. If the signals exceed a stored value, the Inflatable Restraint Sensing and Diagnostic Module will determine the severity of the impact and either cause current to flow through the frontal deployment loops deploying the frontal air bags and pretensioners, or it will deploy the pretensioners only. The Inflatable Restraint Sensing and Diagnostic Module continuously monitors the deployment loops for malfunctions and illuminates the SIR system AIR BAG indicator if a fault is detected. The Inflatable Restraint Sensing and Diagnostic Module performs continuous diagnostic monitoring of the SIR system electrical components. Upon detection of a circuit malfunction, the Inflatable Restraint Sensing and Diagnostic Module will set a DTC and inform the driver by illuminating the SIR system AIR BAG indicator. The steering column and knee bolsters are designed to absorb energy and compress during frontal collisions in order to limit leg movement and decrease the chance of injury to the driver and passenger.

SIR System AIR BAG Indicator

The SIR system AIR BAG indicator, located in the instrument cluster, is used to notify the driver of SIR system malfunctions and to verify that the Inflatable Restraint Sensing and Diagnostic Module (SDM) is communicating with the instrument cluster. When the ignition is turned ON, the Inflatable Restraint Sensing and Diagnostic Module is supplied with ignition positive voltage. The instrument cluster will momentarily turn on the SIR system AIR BAG indicator. While the indicator is on, the Inflatable Restraint Sensing and Diagnostic Module conducts tests on all SIR system components and circuits. If no malfunctions are detected the Inflatable Restraint Sensing and Diagnostic Module will communicate with the instrument cluster through the serial data circuit and command the SIR system AIR BAG indicator OFF. The Inflatable Restraint Sensing and Diagnostic Module provides continuous monitoring of the air bag circuits by conducting a sequence of checks. If a malfunction is detected the Inflatable Restraint Sensing and Diagnostic Module will store a diagnostic trouble code (DTC) and command the instrument cluster to illuminate the SIR system AIR BAG indicator via serial data. The presence of a SIR system malfunction could result in non-deployment of the air bags or deployment in conditions less severe than intended. The SIR system AIR BAG indicator will remain ON until the malfunction has been repaired.

Inflatable Restraint Sensing and Diagnostic Module (SDM)

The Inflatable Restraint Sensing and Diagnostic Module (SDM) is a microprocessor and the control center for the supplemental inflatable restraint (SIR) system. The Inflatable Restraint Sensing and Diagnostic Module contains internal sensors along with external impact sensors, mounted at strategic locations on the vehicle. In the event of a collision, the Inflatable Restraint Sensing and Diagnostic Module compares the signals from the internal and external impact sensors to a value stored in memory. When the generated signals exceed the stored value, the Inflatable Restraint Sensing and Diagnostic Module will cause current to flow through the appropriate deployment loops to deploy the air bags. The Inflatable Restraint Sensing and Diagnostic Module records the SIR system status when a deployment occurs and illuminates the SIR system AIR BAG indicator located in the instrument cluster. The Inflatable Restraint Sensing and Diagnostic Module performs continuous diagnostic monitoring of the SIR system electrical components and circuitry when the ignition is turned ON. If the Inflatable Restraint Sensing and Diagnostic Module detects a malfunction, a DTC will be stored and the Inflatable Restraint Sensing and Diagnostic Module will request the instrument cluster to illuminate the AIR BAG indicator, notifying the driver that a malfunction exists. In the event that ignition positive voltage is lost during a collision, the Inflatable Restraint Sensing and Diagnostic Module maintains a 23-volt loop reserve for deployment of the air bags. It is important when disabling the SIR system for servicing or rescue operations to allow the 23-volt loop reserve to dissipate, which could take up to 1 minute.

Air Bags

This vehicle contains 5 air bags. The 5 air bags are located in the driver steering wheel (dual air bags), passenger instrument panel (passenger side) (dual air bags), left roof rail, right roof rail, and right rear roof rail. To view the locations of the air bags refer to Master Electrical Component List. Air bags contain a housing, inflatable air bag, two initiating devices (if dual air bags), canister of gas generating material and, in some cases, stored compressed gas. The deployment loops supply current to deploy the air bags. The steering wheel and passenger instrument panel air bags have two stages of deployment, which varies the amount of restraint to the occupant according to the collision severity. For moderate frontal collisions the air bags deploy at less than full deployment which consists of stage 1 of the air bag. For more severe frontal collisions a full deployment is initiated which consists of stage 1 and stage 2 of the air bag. The current passing through the air bags ignite the material in the canister producing a rapid generation of gas and is some cases, the release of compressed gas. The gas produced from this reaction rapidly inflates the air bag. Once the air bag is inflated it quickly deflates through the air bag vent holes and/or the bag fabric. A shorting bar (if equipped) is located in the connector.

Seat Belt Pretensioners (Buckle)

The seat belt pretensioners (driver and passenger) consist of a housing, seat belt buckle (pretensioner), seat belt webbing, an initiator, and a canister of gas generating materials. To view the locations of the seat belt pretentioners refer to Master Electrical Component List. The initiator is part of the seat belt pretensioner deployment loop. When the vehicle is involved in a collision of sufficient force, the Inflatable Restraint Sensing and Diagnostic Module causes current to flow through the seat belt deployment loops to the initiator. Current passing through the initiator ignites the material in the canister producing a rapid generation of gas. The gas produced from this reaction deploys the seat belt pretensioners which removes all of the slack in the seat belts. Depending on the severity of the collision, the seat belt pretensioners may deploy without the front air bags deploying, or they will deploy immediately before the front air bags deploy. A shorting bar (if equipped) is located in the connector.

Impact Sensors

This vehicle contains anywhere from 3–5 impact sensors depending on option content. The options are as follows:

- Light Duty has 5 impact sensors: 1 in the front, 2 in the doors, 2 in the body
- Heavy Duty Regular Cab has 3 impact sensors: 1 in the front, 2 in the doors

To view the locations of the impact sensors refer to Master Electrical Component List. The impact sensors contain a sensing device which monitors vehicle acceleration and velocity changes to detect side collisions that are severe enough to warrant air bag deployment. The impact sensors are not part of the deployment loop, but instead provide input to the Inflatable Restraint Sensing and Diagnostic Module. The Inflatable Restraint Sensing and Diagnostic Module contains a microprocessor that performs calculations using the measured accelerations and compares these calculations to a value stored in memory. When the generated calculations exceed the stored value, the Inflatable Restraint Sensing and Diagnostic Module will cause current to flow through the deployment loops deploying the appropriate air bags.

Passenger Presence Detection System and Passenger Air Bag Indicator

Note: The passenger presence system (PPS) is a calibrated unit. When replacing the assembly all parts in the service kit must remain together. Do not mix any of the old parts with the new parts. After repairing or replacing the PPS, the preload test must be performed in order to function properly.

The passenger presence system is used to monitor the type of occupant that is sitting in the front passenger seat and communicate the status to the Inflatable Restraint Sensing and Diagnostic Module (SDM). The Inflatable Restraint Sensing and Diagnostic Module then uses this information to determine whether to enable or suppress the deployment of the passenger instrument panel air bag. The passenger presence system consists of an electronic control module, a sensor mat in the seat, a harness, and PASSENGER AIR BAG ON/OFF indicators. The passenger presence system transmits and receives a low-level electric field. The measured capacitance value of this field is used to determine the type of occupant sitting in the front passenger seat. If the measured capacitance is less than a calibrated value, then the passenger presence module will send a serial data signal to the Inflatable Restraint Sensing and Diagnostic Module to disable the passenger instrument panel air bag. If the measured capacitance is greater than a calibrated value, then the passenger presence module will send a serial data signal to the Inflatable Restraint Sensing and Diagnostic Module to enable the passenger instrument panel air bag. The Inflatable Restraint Sensing and Diagnostic Module will notify the customer of the enable/disable status by illuminating one of the PASSENGER AIR BAG ON/OFF indicator. The passenger presence system monitors itself for faults and will displays diagnostic trouble codes (DTCs) on the scan tool. When a fault is detected, the passenger presence module sends out a message to the Inflatable Restraint Sensing and Diagnostic Module. The Inflatable Restraint Sensing and Diagnostic Module responds by sending a command message to the IPC to illuminate the SIR system AIR BAG indicator.

Vehicle Roll Over Sensor

The vehicle roll over sensor is used to supplement the side Supplemental Inflatable Restraint (SIR) System. The Inflatable Restraint Sensing and Diagnostic Module (SDM) uses the input from the vehicle roll over sensor to assist in determining the severity of a vehicle roll over or near roll over condition. If the Inflatable Restraint Sensing and Diagnostic Module determines a deployment is warranted, the Inflatable Restraint Sensing and Diagnostic Module will cause current to flow through the deployment loops deploying the roof rail air bags.

Seat Belt Indicators

The seat belt indicators are controlled through the Inflatable Restraint Sensing and Diagnostic Module (SDM). For further information on seat belt indicators refer to Seat Belt System Description and Operation

Seats

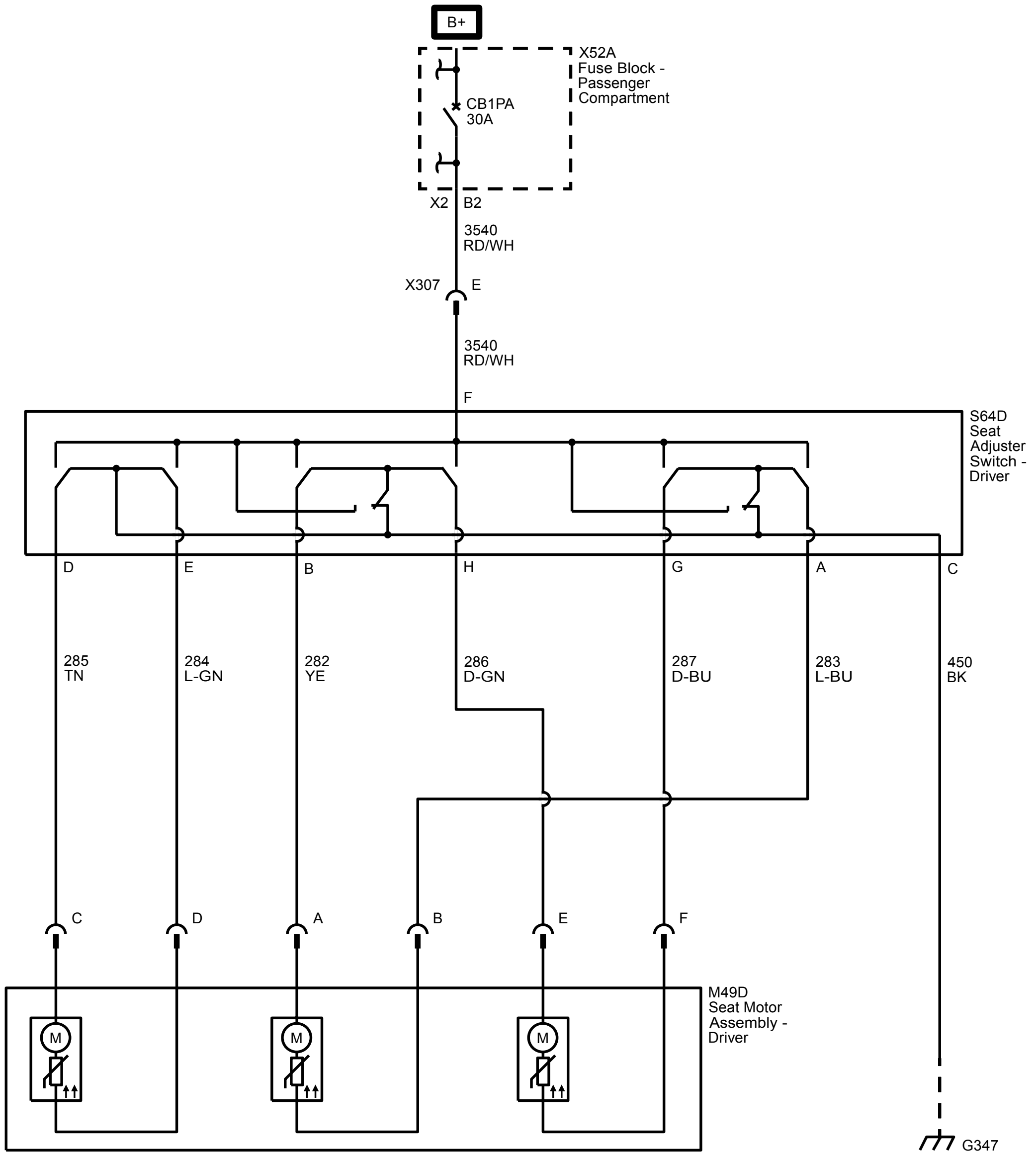
Power Seats

Schematic and Routing Diagrams

Driver Seat Schematics

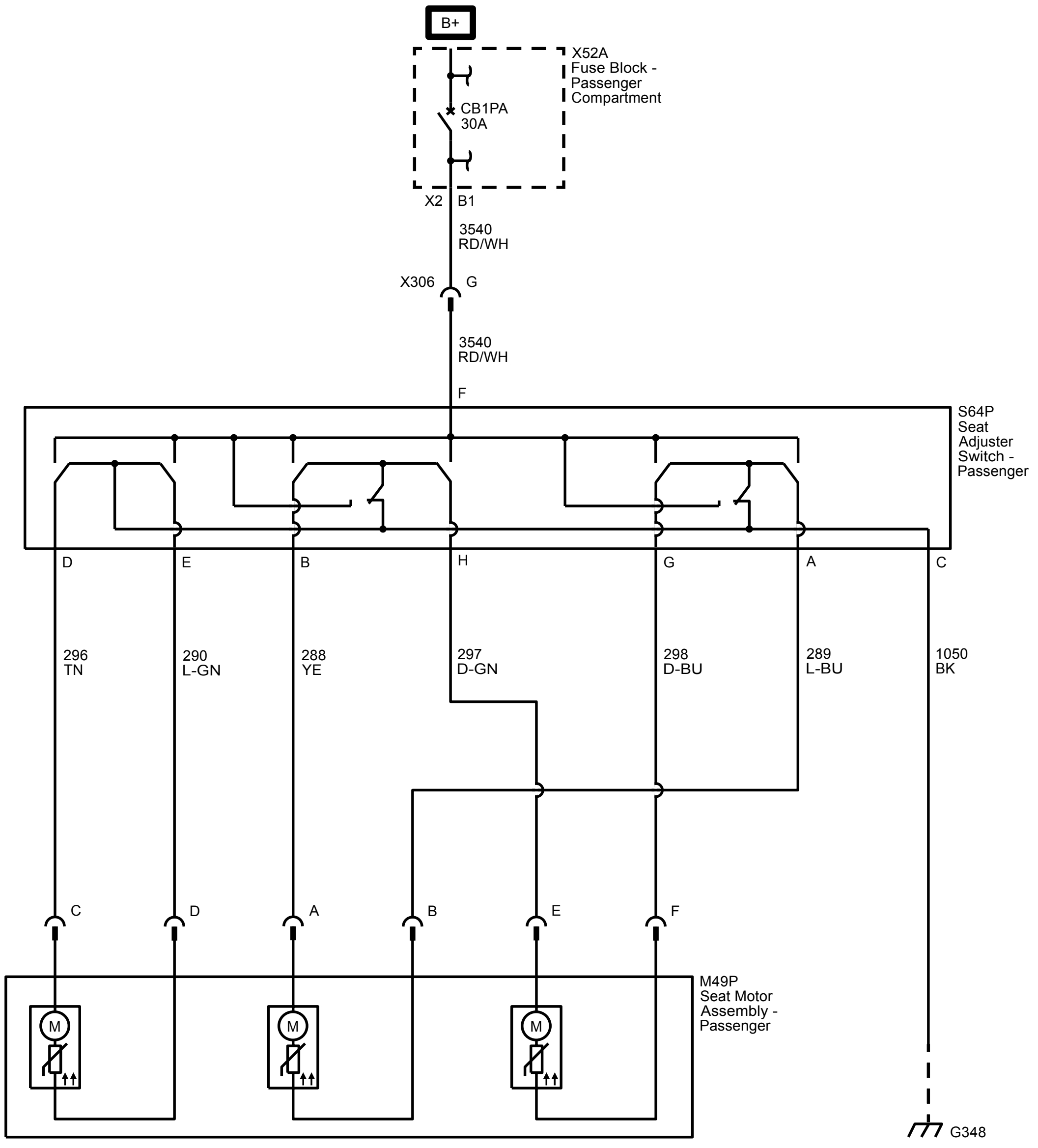
Driver Seat (AG1)

LOC
DESC


B+
X52A
Fuse Block - Passenger Compartment
CB1PA
30A
X2
B2
3540
RD/WH
X307
E
3540
RD/WH
F
S64D
Seat Adjuster Switch - Driver
D
E
B
H
G
A
C
285
TN
284
L-GN
282
YE
286
D-GN
287
D-BU
283
L-BU
450
BK
C
D
A
B
E
F
M49D
Seat Motor Assembly - Driver
M
M
M
G347

Passenger Seat Schematics

Passenger Seat (AG2)


B+
X52A
Fuse Block -
Passenger
Compartment
CB1PA
30A
X2
B1
3540
RD/WH
X306
G
3540
RD/WH
F
S64P
Seat
Adjuster
Switch -
Passenger
D
E
B
H
G
A
C
296
TN
290
L-GN
288
YE
297
D-GN
298
D-BU
289
L-BU
1050
BK
C
D
A
B
E
F
M
M
M
M49P
Seat Motor
Assembly -
Passenger
G348

Description and Operation

Power Seats System Description and Operation

Power Seat System Components

The power seat system for the driver and passenger consists of the following components:

- Power Seat Switch
- Seat Horizontal Motor
- Seat Front Vertical Motor
- Seat Rear Vertical Motor

Power Seat System Operation

This seat contains three motors for positioning. They are the Horizontal motor, Rear Vertical motor, and a Front Vertical motor The Horizontal motor moves the seat forward and rearward. The Front Vertical motor raises and lowers the front of the seat and the Rear Vertical motor raises and lowers the rear of the seat. Power is supplied to the motors through a battery positive voltage supply circuit at the Power Seat Switch. A ground circuit is supplied to the motors through the Power Seat Switch also.

The direction the motor operates depends on the polarity applied to the motor control circuits. Each time direction is changed using the power seat switch, the power and ground paths are reversed at the control circuits causing the motor to position the seat in the desired direction.

Suspension

Tire Pressure Monitoring

Description and Operation

Tire Pressure Monitor Description and Operation

The tire pressure monitor (TPM) system warns the driver when a significant loss, or gain of tire pressure occurs in any of the 4 tires and allows the driver to display the individual tire pressures and their locations on the driver information center (DIC).

The system uses the body control module (BCM), driver information center (DIC), instrument panel cluster (IPC), remote control door lock receiver (RCDLR), a radio frequency (RF) transmitting pressure sensor in each wheel/tire assembly, and the serial data circuit to perform the system functions. Each sensor has an internal power supply with a 10 year service life.

When the vehicle is stationary, the sensors internal accelerometer is inactive, which puts the sensors into a stationary state. In this state the sensors sample tire pressure once every 30 seconds and do not transmit at all if the tire pressure does not change. As vehicle speed increases, centrifugal force activates the sensors internal accelerometer causing the sensors to go into rolling mode. In this mode, the sensors sample tire pressure once every 30 seconds and transmit in rolling mode once every 60 seconds. The RCDLR receives and translates the data contained in each sensors RF transmission into sensor presence, sensor mode, and tire pressure. The RCDLR sends the tire pressure and tire location data to the DIC via the serial data circuit where they are displayed.

The sensors continuously compare their last pressure sample to their current pressure sample and will transmit in re-measure mode if a 8.3 kPa (1.2 psi) change in tire pressure has been detected in either a stationary or rolling state. When the TPM system detects a significant loss, or gain of tire pressure, the tire pressure monitor indicator icon is illuminated on the IPC and if equipped, a check tire pressure type message is displayed on the DIC. Both the indicator icon and DIC message can be cleared by adjusting the tire pressures to the recommended kPa/psi and driving the vehicle above 40 km/h (25 mph) for at least 2 minutes.

If power is disconnected from the RCDLR or if the vehicle battery is disconnected each TPM sensor ID is retained but all of the tire pressure information is lost. Under these circumstances the RCDLR cannot assume that the tire pressures were maintained over an unknown period of time. If equipped, the DIC will display all dashes and the scan tool will indicate a default tire pressure value of 1020 kPa (148 psi) for each tire. Driving the vehicle above 40 km/h (25 mph) for at least 2 minutes will activate the sensors causing the DIC to display the current tire pressures. The **sptool-no** Tire Pressure Monitor Diagnostic Tool special tool or the pressure increase/decrease method may also be used to activate the sensors as well.

The RCDLR has the ability to detect malfunctions within the TPM system. In the event a DTC is set, the tire pressure monitor indicator icon on the IPC will flash for 1 minute and then remain illuminated after the ignition is turned ON and the IPC bulb check has been completed. Any malfunction detected will cause the DIC to display a service tire monitor system type message. For more information on other functions of the RCDLR, refer to Keyless Entry System Description and Operation.

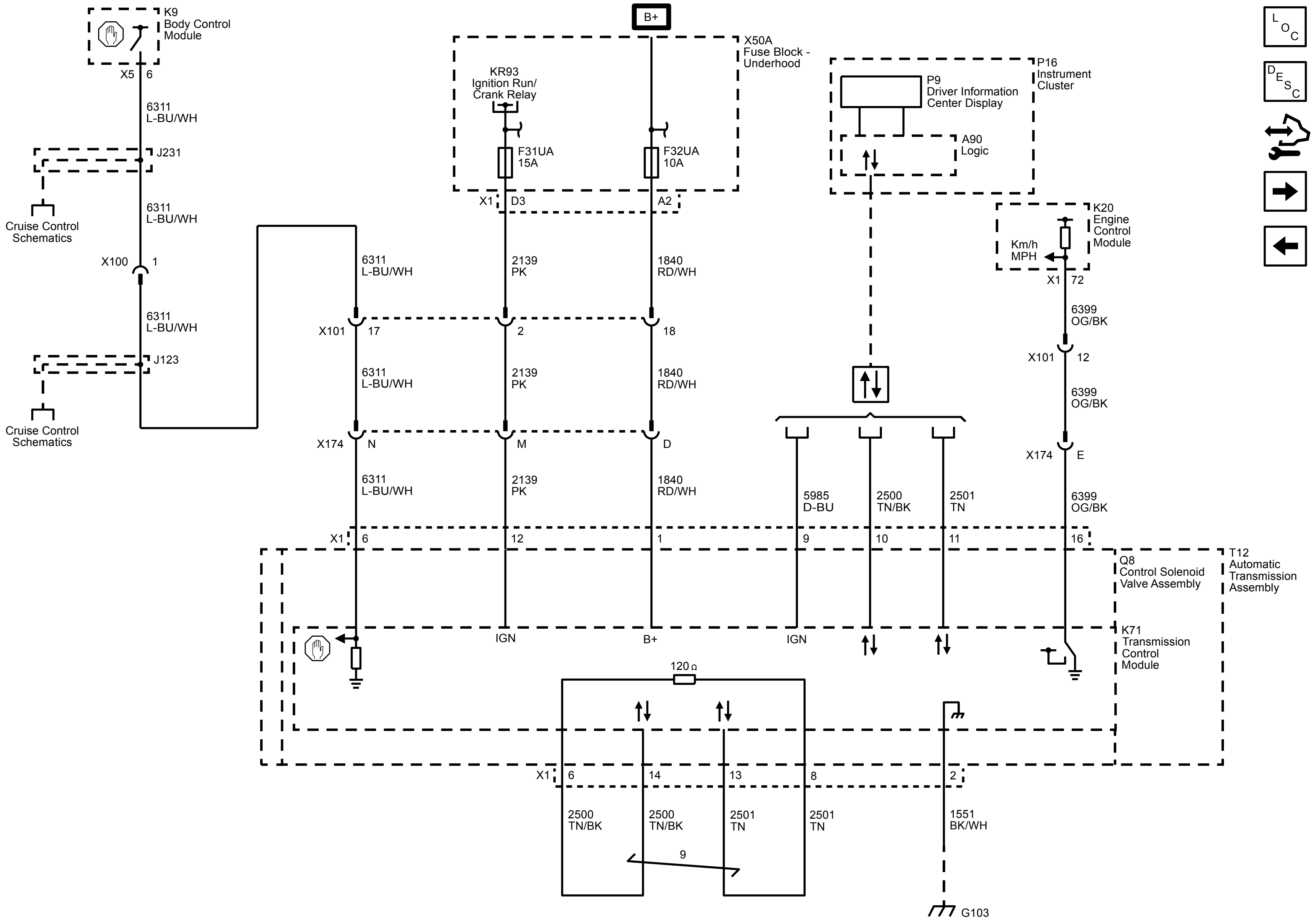
Transmission

Automatic Transmission - 6L90 (MYD)

Schematic and Routing Diagrams

Automatic Transmission Controls Schematics

Module Power, Ground, Data Communication, MIL, and Stop Lamp Signal (Diesel)

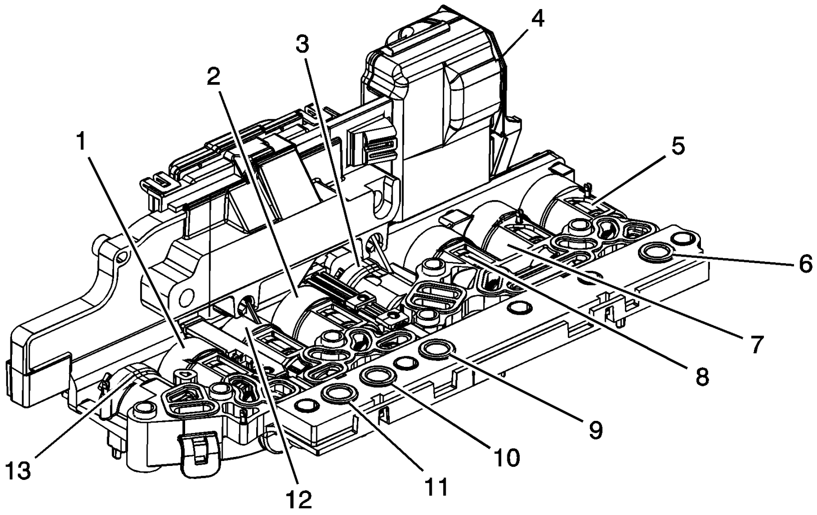


K9
Body Control
Module
X5 6
6311
L-BU/WH
J231
Cruise Control
Schematics
X100 1
J123
Cruise Control
Schematics
B+
X50A
Fuse Block -
Underhood
KR93
Ignition Run/
Crank Relay
F31UA
15A
F32UA
10A
X1 D3
A2
2139
PK
1840
RD/WH
X101 17
2
18
X174 N
M
D
P16
Instrument
Cluster
P9
Driver Information
Center Display
A90
Logic
K20
Engine
Control
Module
Km/h
MPH
X1 72
6399
OG/BK
X101 12
X174 E
5985
D-BU
2500
TN/BK
2501
TN
X1 6
12
1
9
10
11
16
Q8
Control Solenoid
Valve Assembly
T12
Automatic
Transmission
Assembly
K71
Transmission
Control
Module
IGN
B+
IGN
120 Ω
X1 6
14
13
8
2
1551
BK/WH
9
G103
L O C
D E S C

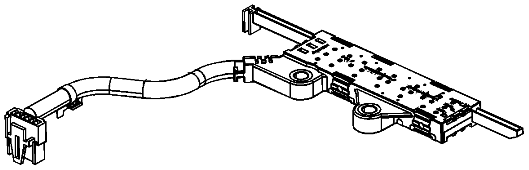
Description and Operation

Electronic Component Description

Control Solenoid (W/Body and TCM) Valve Assembly

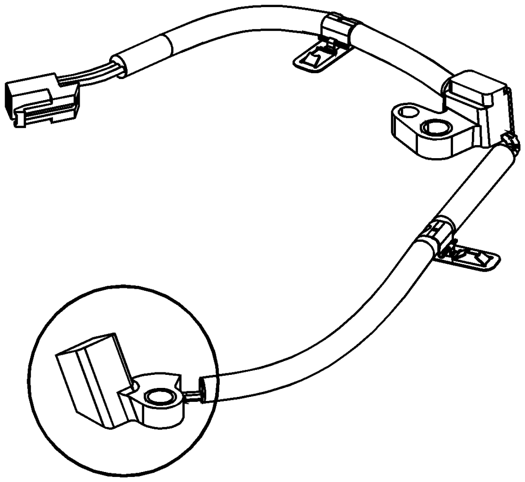


Internal Mode Switch (IMS)



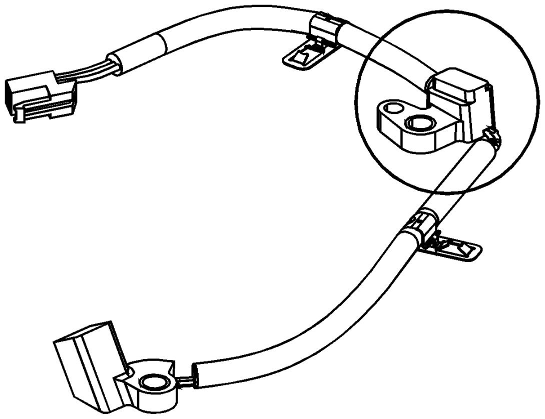
The transmission manual shift shaft switch assembly is a sliding contact switch attached to the manual shift shaft inside the transmission case. The five inputs to the TCM from the transmission manual shift shaft switch assembly indicate the transmission gear selector lever position. This information is used for engine controls as well as determining the transmission shift patterns. The state of each input is available for display on the scan tool. The five input parameters represented are Signal A, Signal B, Signal C, Signal P (Parity) and Signal N (P/N Start).

Input Speed Sensor (ISS)



The input speed sensor (ISS) is a hall-effect type sensor. The ISS mounts to the control valve upper body assembly and connects to the control solenoid valve assembly through a wire harness and connector. The sensor faces the 1-2-3-4 and 3-5-R clutch housing machined teeth surface. The sensor receives 8.3–9.3 volts on the ISS/OSS Supply Voltage circuit from the TCM. As the 1-2-3-4 and 3-5-R clutch housing rotates, the sensor produces a signal frequency based on the machined surface of the 1-2-3-4 and 3-5-R clutch housing. This signal is transmitted through the ISS signal circuit to the control solenoid valve assembly. The control solenoid valve assembly uses the ISS signal to determine line pressure, transmission shift patterns, torque converter clutch (TCC) slip speed and gear ratio.

Output Speed Sensor (OSS)



The output speed sensor (OSS) is a hall-effect type sensor. The OSS mounts to the control valve upper body assembly and connects to the control solenoid valve assembly through a wire harness and connector. The sensor faces the output shaft machined teeth surface. The sensor receives 8.3–9.3 volts on the ISS/OSS supply voltage circuit from the TCM. As the output shaft rotates, the sensor produces a signal frequency based on the machined surface of the output shaft. This signal is transmitted through the OSS signal circuit to the TCM. The TCM uses the OSS signal to determine line pressure, transmission shift patterns, torque converter clutch (TCC) slip speed and gear ratio.

Transmission

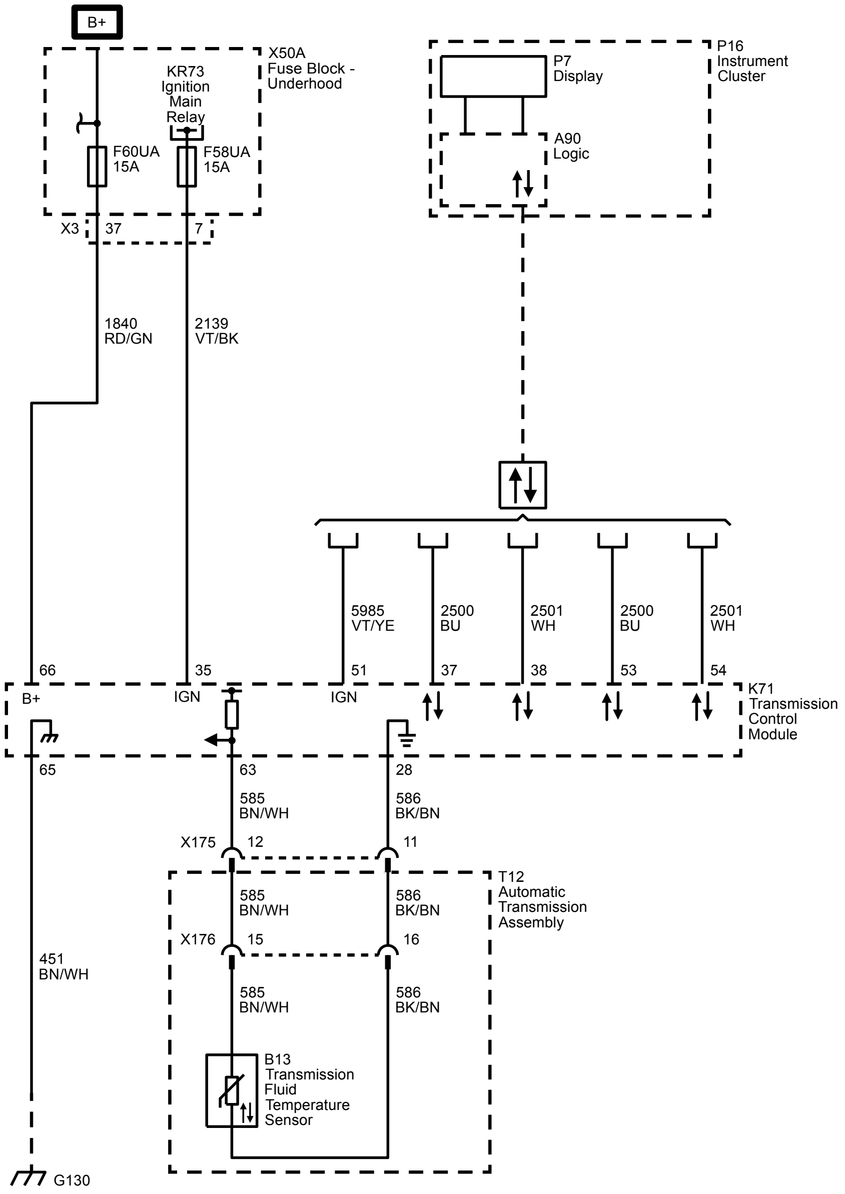
Automatic Transmission - 8L90 (M5U)

Schematic and Routing Diagrams

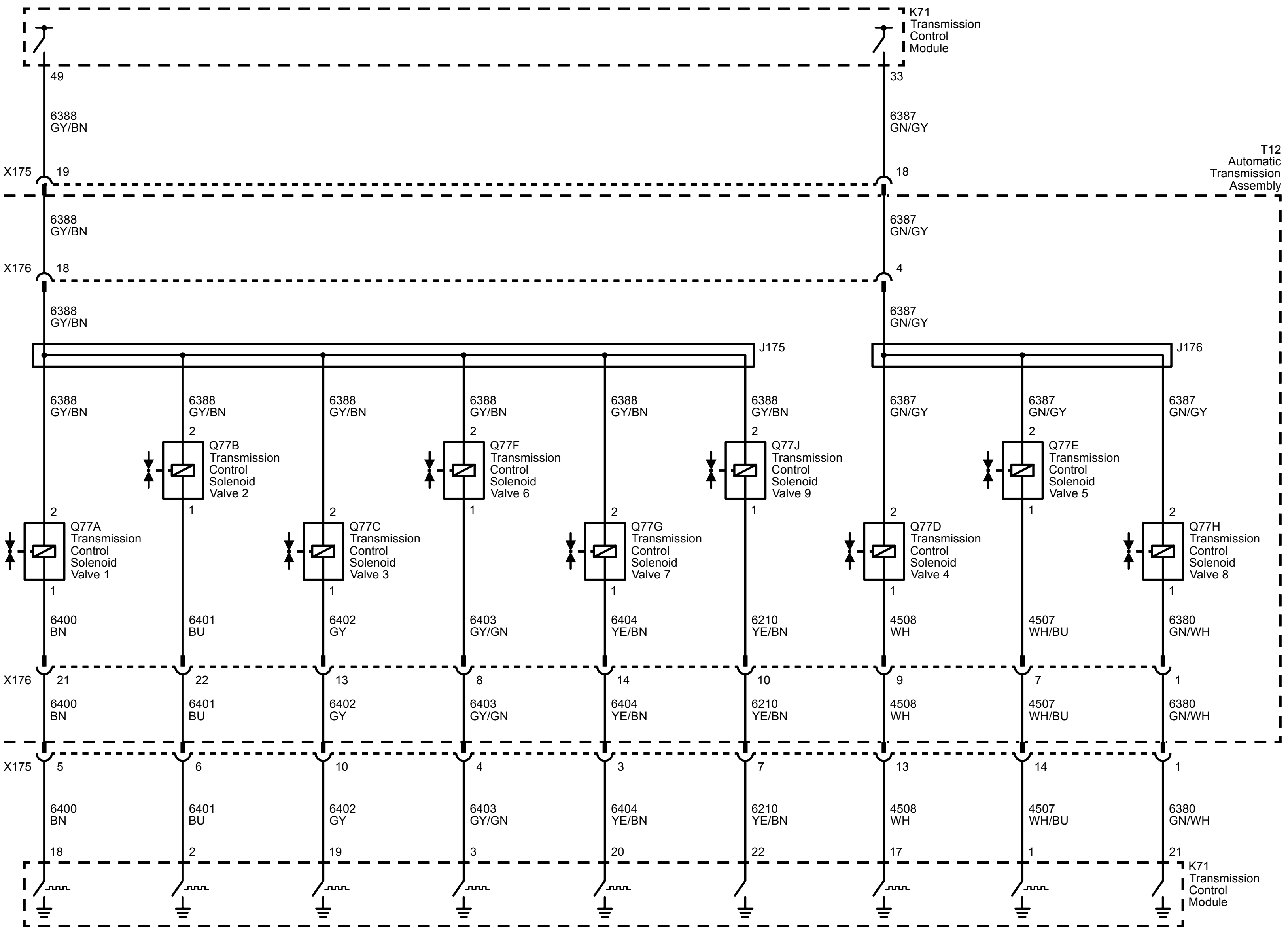
Automatic Transmission Controls Schematics

Power, Ground, Serial Data, MIL and Fluid Temperature

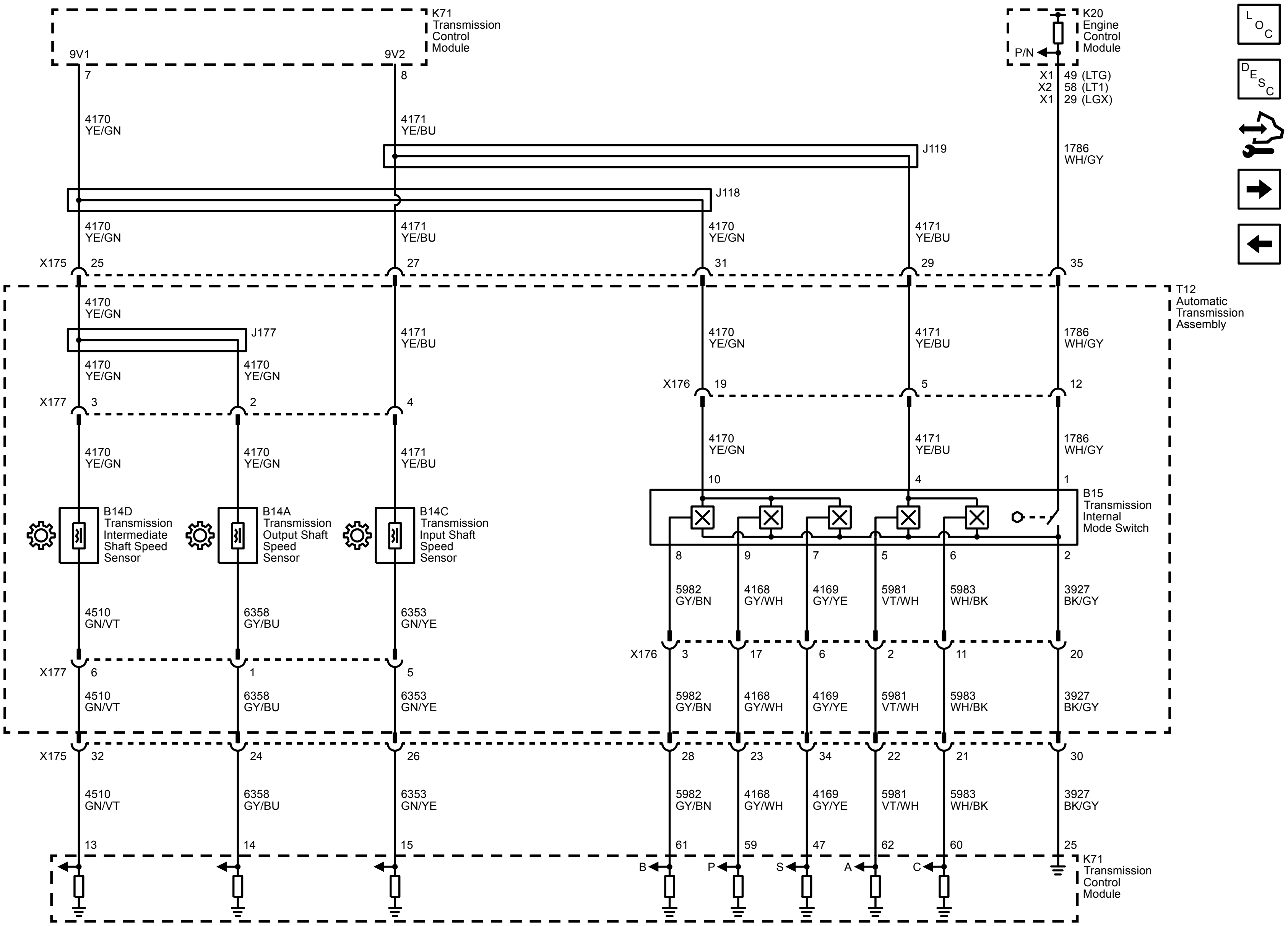
LOC
DESC


B+
X50A Fuse Block - Underhood
KR73 Ignition Main Relay
F60UA 15A
F58UA 15A
X3
37
7
1840 RD/GN
2139 VT/BK
P16 Instrument Cluster
P7 Display
A90 Logic
5985 VT/YE
2500 BU
2501 WH
2500 BU
2501 WH
66
35
51
37
38
53
54
B+
IGN
IGN
K71 Transmission Control Module
65
63
28
585 BN/WH
586 BK/BN
X175
12
11
T12 Automatic Transmission Assembly
585 BN/WH
586 BK/BN
X176
15
16
585 BN/WH
586 BK/BN
451 BN/WH
B13 Transmission Fluid Temperature Sensor
G130

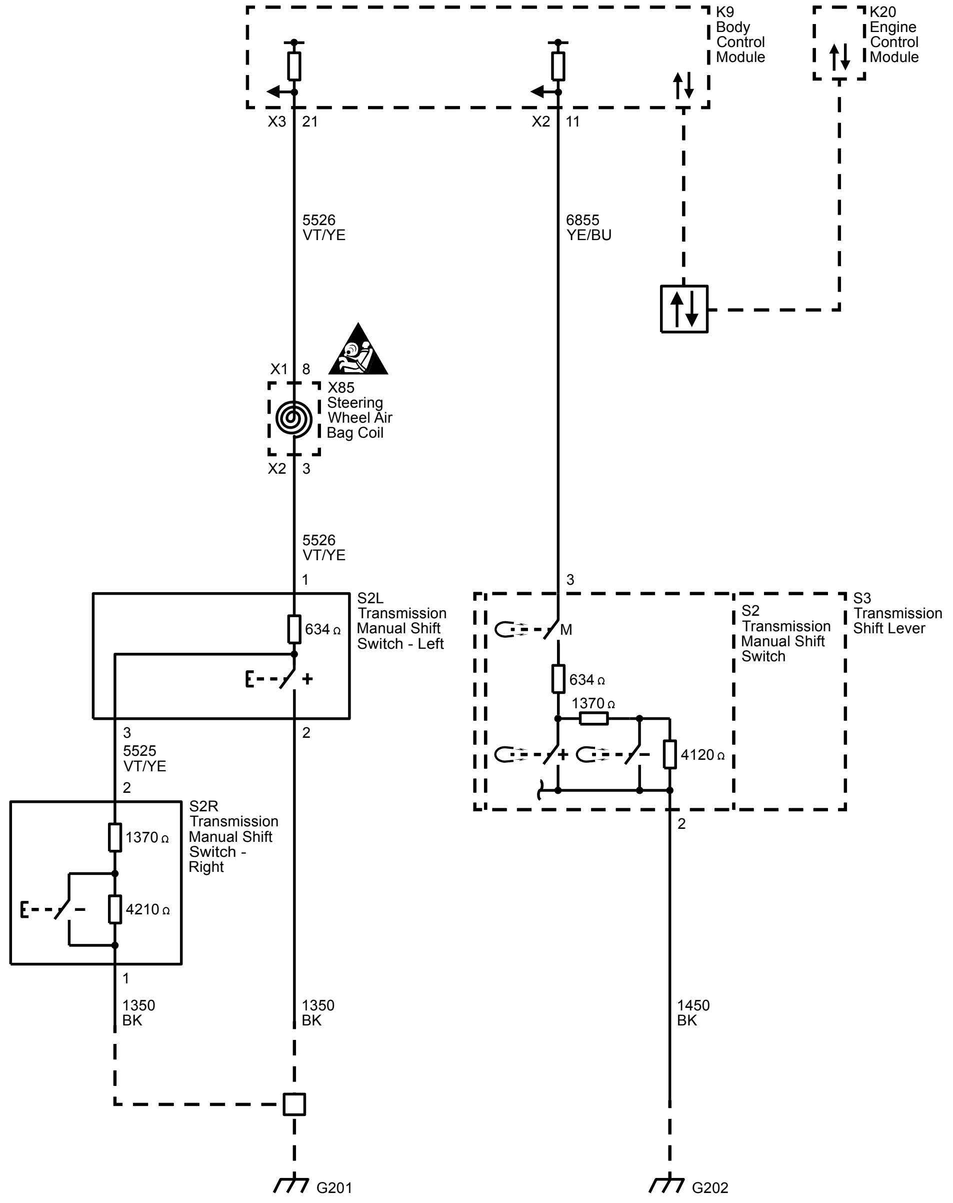
Pressure and Shift Controls


K71 Transmission Control Module
49
33
6388 GY/BN
6387 GN/GY
X175
19
18
T12 Automatic Transmission Assembly
6388 GY/BN
6387 GN/GY
X176
18
4
6388 GY/BN
6387 GN/GY
J175
J176
6388 GY/BN
6387 GN/GY
2
Q77A Transmission Control Solenoid Valve 1
1
Q77B Transmission Control Solenoid Valve 2
Q77C Transmission Control Solenoid Valve 3
Q77D Transmission Control Solenoid Valve 4
Q77E Transmission Control Solenoid Valve 5
Q77F Transmission Control Solenoid Valve 6
Q77G Transmission Control Solenoid Valve 7
Q77H Transmission Control Solenoid Valve 8
Q77J Transmission Control Solenoid Valve 9
6400 BN
6401 BU
6402 GY
6403 GY/GN
6404 YE/BN
6210 YE/BN
4508 WH
4507 WH/BU
6380 GN/WH
X176
21
22
13
8
14
10
9
7
1
X175
5
6
10
4
3
7
13
14
1
18
2
19
3
20
22
17
1
21
K71 Transmission Control Module

Speed Sensors and Internal Mode Switch


K71 Transmission Control Module
9V1
9V2
7
8
4170 YE/GN
4171 YE/BU
J119
J118
K20 Engine Control Module
P/N
X1 49 (LTG)
X2 58 (LT1)
X1 29 (LGX)
1786 WH/GY
X175
25
27
31
29
35
T12 Automatic Transmission Assembly
J177
X176
19
5
12
X177
3
2
4
10
4
1
B15 Transmission Internal Mode Switch
B14D Transmission Intermediate Shaft Speed Sensor
B14A Transmission Output Shaft Speed Sensor
B14C Transmission Input Shaft Speed Sensor
8
9
7
5
6
2
4510 GN/VT
6358 GY/BU
6353 GN/YE
5982 GY/BN
4168 GY/WH
4169 GY/YE
5981 VT/WH
5983 WH/BK
3927 BK/GY
3
17
6
2
11
20
6
1
5
32
24
26
28
23
34
22
21
30
13
14
15
61
59
47
62
60
25
B
P
S
A
C
K71 Transmission Control Module

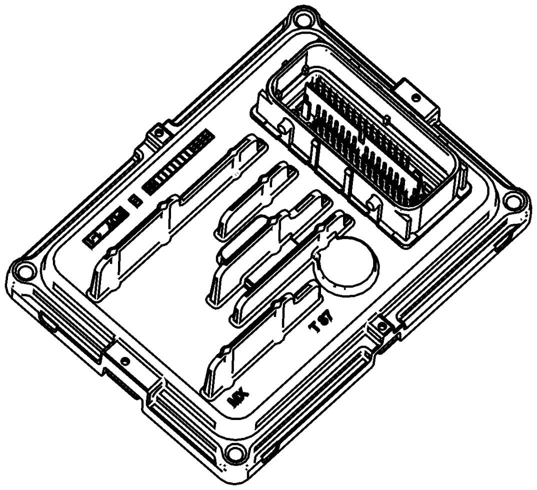
Tap Up/Tap Down Switches


K9
Body
Control
Module
K20
Engine
Control
Module
X3 21
X2 11
5526
VT/YE
6855
YE/BU
X1 8
X85
Steering
Wheel Air
Bag Coil
X2 3
5526
VT/YE
1
S2L
Transmission
Manual Shift
Switch - Left
634 Ω
+
3
2
5525
VT/YE
2
S2R
Transmission
Manual Shift
Switch -
Right
1370 Ω
4210 Ω
1
1350
BK
1350
BK
3
M
634 Ω
1370 Ω
+
4120 Ω
S2
Transmission
Manual Shift
Switch
S3
Transmission
Shift Lever
2
1450
BK
G201
G202

Description and Operation

Electronic Component Description

Transmission Control Module



The Transmission Control Module (TCM) for this transmission is a standalone controller mounted to the vehicle. The TCM has one 66 way connector to interface with vehicle electrical system, transmission assembly and other vehicle control modules. The TCM sends and receives various input and output signals from a number of switches and sensors internal and external to the transmission. In addition, the TCM is part of a network of other control modules on the vehicle. The network of control modules will share information with each other, over a common serial data communications line. Based upon the calibrations and input information the TCM receives, it will always have final authority of when to allow an upshift or downshift whether in manual mode operation or in drive position for automatic shifting.

Transmission Solenoid Valves

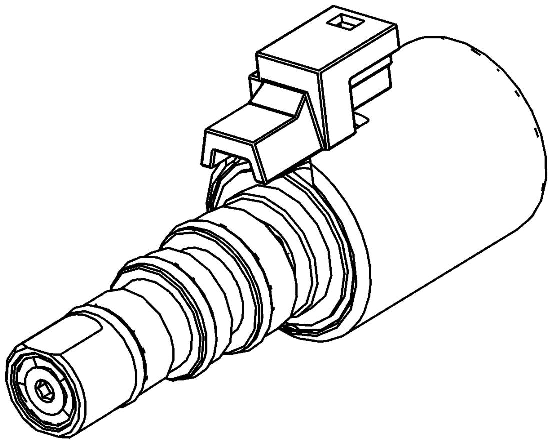
The 8L45/90 transmission contains a total of nine individual solenoids installed in various bore locations on the lower control valve body assembly. Seven of the nine solenoid valves are used to control pressure regulation and direction of transmission fluid and the two ON/OFF solenoid valves are only used to direct transmission fluid.

There are three slightly different variations of the pressure regulating solenoid valves used on this transmission. They are; high pressure normally low, high pressure normally high and low pressure normally high, variable force solenoid valves.

- High Pressure = Indicates the solenoid valve is controlling or directing line pressure.
- Low Pressure = Indicates the solenoid valve is directing a pressurized fluid that is less than line pressure.
- Normally Low = When no current is applied to the solenoid valve coil the variable restriction is closed, resulting in no or low pressure.
- Normally High = When no current is applied to the solenoid valve coil the variable restriction is open, resulting in maximum or high pressure.
- Variable Force Solenoid Valve = This type of solenoid can increase or decrease the amount of pressurized fluid based on the amount of current applied to solenoid valve coil.

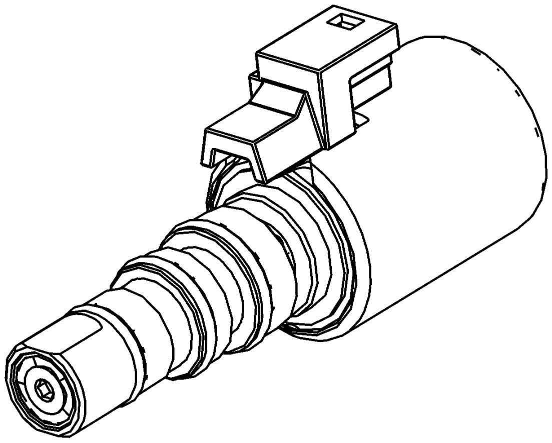
Pressure Regulating Solenoid Valves

High Pressure, Normally Low, Variable Force Solenoid Valves



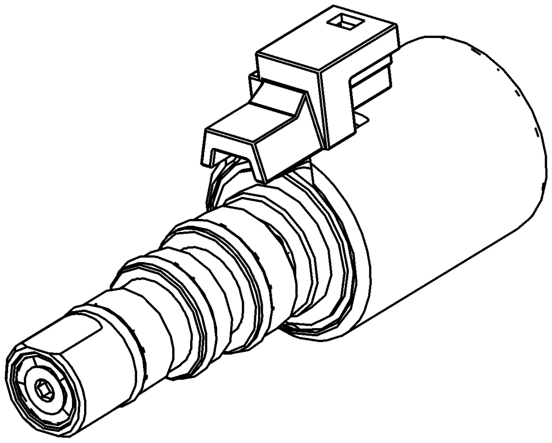
Transmission Control Solenoid Valves 2, 3, and 7 are high pressure, normally low, variable force solenoid valves. This type of solenoid valve regulates hydraulic fluid pressure based on current flow through the solenoid valve coil windings. Each solenoid valve receives 12 V from a high side driver internal to the TCM. Each solenoid valve has a control circuit to an individual low side driver internal to the TCM, which turns ON and OFF to control the amount of current. As an increasing current is applied to the solenoid coil windings, the force imparted to the armature overcomes the armature spring pressure resulting in an increase in fluid pressure to the controlled element. The normal operating current range for these solenoid valves is between 0–1.2 A. If the TCM detects an electrical circuit malfunction or excessive current flow, the TCM turn off the high side driver to that solenoid and sets a DTC. The high side driver will reset when the circuit fault is corrected and the ignition switch is cycled.

Low Pressure Normally High, Variable Force Solenoid Valves



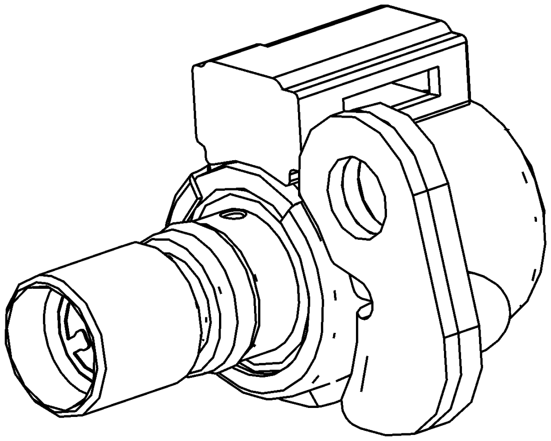
Transmission Control Solenoid Valves 1, 5, and 6 are low pressure, normally high, variable force solenoid valves. This type of solenoid valve regulates hydraulic fluid pressure based on current flow through the solenoid valve coil windings. Each solenoid valve receives 12 V from a high side driver internal to the TCM. Each solenoid valve has a control circuit to an individual low side driver internal to the TCM, which turns ON and OFF to control the amount current. As an increasing current is applied to the coil windings, the force imparted to the armature overcomes the low fluid pressure acting on the armature resulting in a decrease in fluid pressure to the controlled element. The normal operating current range for these solenoids is between 0–1.2 A. If the TCM detects an electrical circuit malfunction or excessive current flow, the TCM turns off the high side driver to that solenoid valve and sets a DTC. The high side driver will reset when the circuit fault is corrected and the ignition switch is cycled.

High Pressure Normally High, Variable Force Solenoid Valve



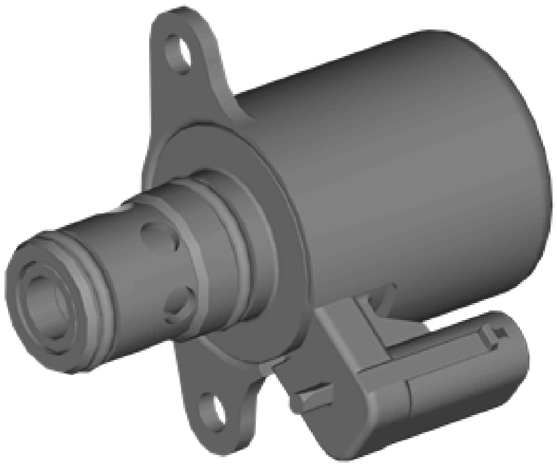
Transmission Control Solenoid Valve 4 is a high pressure, normally high, variable force solenoid valve. This type of solenoid valve regulates hydraulic fluid pressure based on current flow through the solenoid valve coil windings. Each solenoid receives 12 V from a high side driver internal to the TCM. This solenoid has a control circuit to an individual low side driver internal to the TCM, which turns ON and OFF to control the amount of current. As an increasing current is applied to the coil windings, the force imparted to the armature overcomes the high fluid pressure acting on the solenoid valve armature resulting in a decrease in fluid pressure to the controlled element. The normal operating current range for this solenoid is between 0–1.2 A. If the TCM detects an electrical circuit malfunction or excessive current flow, the TCM turns off the high side driver to that solenoid and sets a DTC. The high side driver will reset when the circuit fault is corrected and the ignition switch is cycled.

ON/OFF Solenoid Valves



Transmission Control Solenoid Valve 8 and 9 are normally low, ON/OFF solenoids. These solenoids only direct hydraulic fluid pressure when commanded ON. Each solenoid receives 12 V from a high side driver internal to the TCM. Each solenoid valve has a control circuit to an individual low side driver internal to the TCM. The normal operating current range for these solenoids is between 0–1 A. If the TCM detects an electrical circuit malfunction or excessive current flow, the TCM turns off the high side driver to that solenoid and sets a DTC. The high side driver will reset when the circuit fault is corrected and the ignition switch is cycled.

Transmission Fluid Pressure Accumulator Solenoid Valve – If Equipped



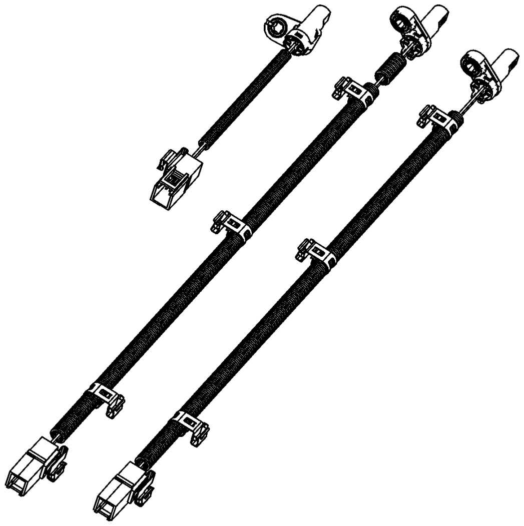
The Transmission Fluid Pressure Accumulator Solenoid Valve is part of the Stop/Start system on the vehicle. The automatic transmission auxiliary fluid accumulator is used to supply transmission fluid line pressure to the appropriate clutches for an auto start event. Attached to the accumulator is a normally closed ON/OFF solenoid. When the ignition is ON, the engine control ignition relay supplies 12 V to the accumulator solenoid. To complete the circuit, the engine control module (ECM) supplies a control circuit to the accumulator solenoid. When the ECM requests an auto start event, the solenoid is commanded ON, allowing captured pressurized fluid to exit the accumulator to apply the clutches for a 1st gear start.

Solenoid Characterization

Transmission Control Solenoid Valves 1–7 are pressure regulating valves. Each solenoid valve is tested after assembly to determine the output fluid pressure at certain electrical current values, applied to coil windings. This information is refer to as solenoid current/pressure data points. The solenoid valves are tested two ways, with an increasing and decreasing electrical current applied to the coil windings. The resultant current versus pressure data points are saved and assigned a file number. The file number is marked on the solenoid valve housing end. The performance data file is stored on the TIS web site. This data file is programmed and stored in the vehicle’s TCM. Replacing any of the following components will require the TCM to be programmed with the new or existing solenoid valve performance data.

- TCM – program the new TCM with the existing solenoid data files stored on the TIS web site for all 7 pressure regulating solenoid valves
- One or more solenoid valves – program the TCM with the new data file for only the individual pressure regulating solenoid valves that were replaced
- Lower Control Valve Body Assembly with Solenoid Valves – program the TCM with the new data files stored on the TIS web site for all pressure regulating solenoid valves
- Transmission Assembly – program the TCM with the new data files stored on the TIS web site for all pressure regulating solenoid valves

Speed Sensors



Input Speed Sensor

The input speed sensor assembly is a two wire hall-effect type sensor. The TCM supplies a 9 V signal circuit and a low reference circuit to the input speed sensor. The input speed sensor produces a square wave signal by toggling the 9 V signal circuit low and high based on the leading and trailing edges on the outside diameter of the 1-3-5-6-7 clutch housing. As the rotational speed of the 1-3-5-6-7 clutch housing increases, the frequency of the input speed sensor signal increases. The TCM uses the input speed sensor signal along with the intermediate and output speed sensor signals to determine transmission line pressure, shift patterns, torque converter clutch slip speed and the correct gear ratio.

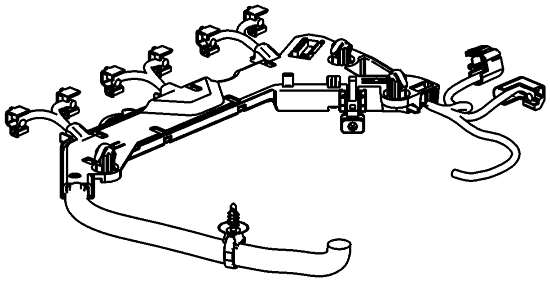
Intermediate Speed Sensor

The intermediate speed sensor assembly is a two wire hall-effect type sensor. The TCM supplies a 9 V signal circuit and a low reference circuit to the intermediate speed sensor. The intermediate speed sensor produces a square wave signal by toggling the 9 V signal circuit low and high based on the leading and trailing edges on the outside diameter of the reaction carrier/output internal gear assembly. As the rotational speed of the reaction carrier/output internal gear assembly increases, the frequency of the intermediate speed sensor signal increases. The TCM uses the intermediate speed sensor signal along with the input and output speed sensor signals to determine transmission line pressure, shift patterns, torque converter clutch slip speed and the correct gear ratio.

Output Speed Sensor

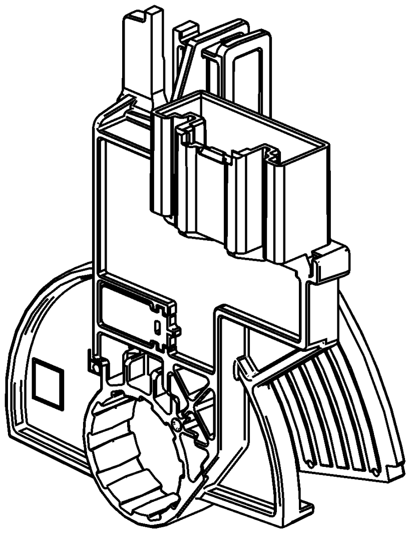
The output speed sensor assembly is a two wire hall-effect type sensor. The TCM supplies a 9 V signal circuit and a low reference circuit to the output speed sensor. The output speed sensor produces a square wave signal by toggling the 9 V signal circuit low and high based on the leading and trailing edges on the outside diameter of the output carrier assembly. As the rotational speed of the output carrier assembly increases, the frequency of the output speed sensor signal increases. The TCM uses the output speed sensor signal along with the input and intermediate speed sensor signals to determine transmission line pressure, shift patterns, torque converter clutch slip speed and the correct gear ratio.

Transmission Fluid Temperature Sensor



The transmission fluid temperature sensor is a 2 wire negative temperature coefficient thermistor. The TCM supplies a 5 V signal circuit and a low reference circuit to the transmission fluid temperature sensor. The transmission fluid temperature sensor measures the temperature of the fluid the in the transmission fluid pan. As the temperature of the fluid increases, the resistance of the sensor decreases, varying the voltage on the signal circuit. The transmission fluid temperature sensor is part of the transmission internal wire harness assembly and has no serviceable parts. If the transmission fluid temperature sensor is faulty, then replace the internal transmission wire harness assembly that has the temp sensor attached to it.

Internal Mode Switch (IMS)



Internal Mode Switch (IMS)

The IMS contains 6 separate switches in one assembly. One mechanical switch circuit is for the park/neutral position switch which is used for engine starting. The other 5 electronic switches are called the transmission range switches and are used to indicate the gear position the vehicle operator has selected. The IMS switch assembly is mounted on the interior left side of the transmission case.

Park Neutral Position Switch of IMS

The park/neutral position switch indicates to the Engine Control Module (ECM) if the vehicle is in park/neutral or in a drive gear range. With the ignition ON, the ECM provides 12 V on the park/neutral signal circuit to the park/neutral position switch. A separate ground wire from the park/neutral position switch to chassis ground completes the circuit. When the gear shift lever in park or neutral, the switch closes and drops the voltage on the signal circuit to 0 V. In this state the engine will start and run. In reverse or drive range the park/neutral position switch opens, 12 V is then present on the signal circuit which will inhibit engine starting.

Transmission Range Switches of the IMS

The internal mode switch (IMS) indicates to the transmission control module (TCM) which gear position the vehicle operator has selected. The IMS consists of 5 separate hall effect switches. Each hall effect switch is supplied a 9 V reference circuit, and a signal circuit from the TCM. Each signal circuit for each gear selector position will have either a voltage reading of 0.70–0.96 V indicting ON or 1.68–2.38 V indicating OFF. The voltage values on each IMS circuit will change and are dependent on the position of the gear selector. The state of each IMS A/B/C/P/S circuit is displayed on the scan tool.

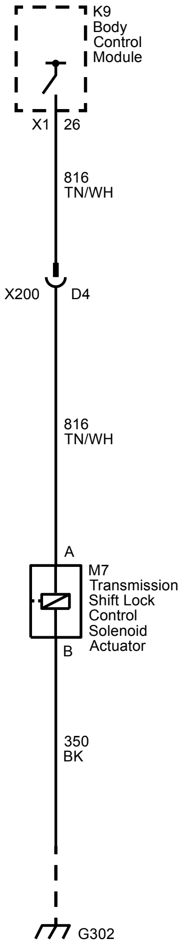
Transmission

Shift Lock Control

Schematic and Routing Diagrams

Shift Lock Control Schematics

Shift Lock Control


K9
Body
Control
Module
X1
26
816
TN/WH
X200
D4
816
TN/WH
A
M7
Transmission
Shift Lock
Control
Solenoid
Actuator
B
350
BK
G302

Description and Operation

Automatic Transmission Shift Lock Control Description and Operation

The automatic transmission shift lock control system is a safety device that prevents an inadvertent shift out of PARK when the engine is running. The driver must press the brake pedal before moving the shift lever out of the PARK position. The system consists of the following components:

- The automatic transmission shift lock solenoid (serviced as the automatic transmission shift lock actuator), as well as the body control module (BCM) and the engine control module (ECM). The shift lock solenoid is located within the floor shift control assembly with vehicles equipped with floor shift.
- The BCM controls the voltage to the shift lock control solenoid through the shift lock control solenoid controlled voltage circuit. The following conditions must be met before the BCM will remove voltage from the shift lock solenoid:
  - The ignition is in the ON position.
  - The engine control module (ECM) sends an input via GMLAN serial data to the BCM indicating the transmission is in the PARK position.
  - The BCM determines the brake pedal is applied according the brake pedal position.

Since the shift lock control solenoid is permanently grounded, the BCM supplies voltage to the automatic transmission shift lock control solenoid, mechanically locking the shift lever in the PARK position as the solenoid energizes. When the brake pedal is applied, the BCM turns the control voltage output of the shift lock control solenoid OFF, de-energizing the shift lock control solenoid. The de-energized solenoid releases the mechanical lock allowing the driver to move the shift lever out of the PARK position. When the transmission is out of the PARK position, the shift lock control solenoid remains de-energized.

During remote start operation, the BCM will energize the shift lock control circuit, locking the shift lever in the PARK position.